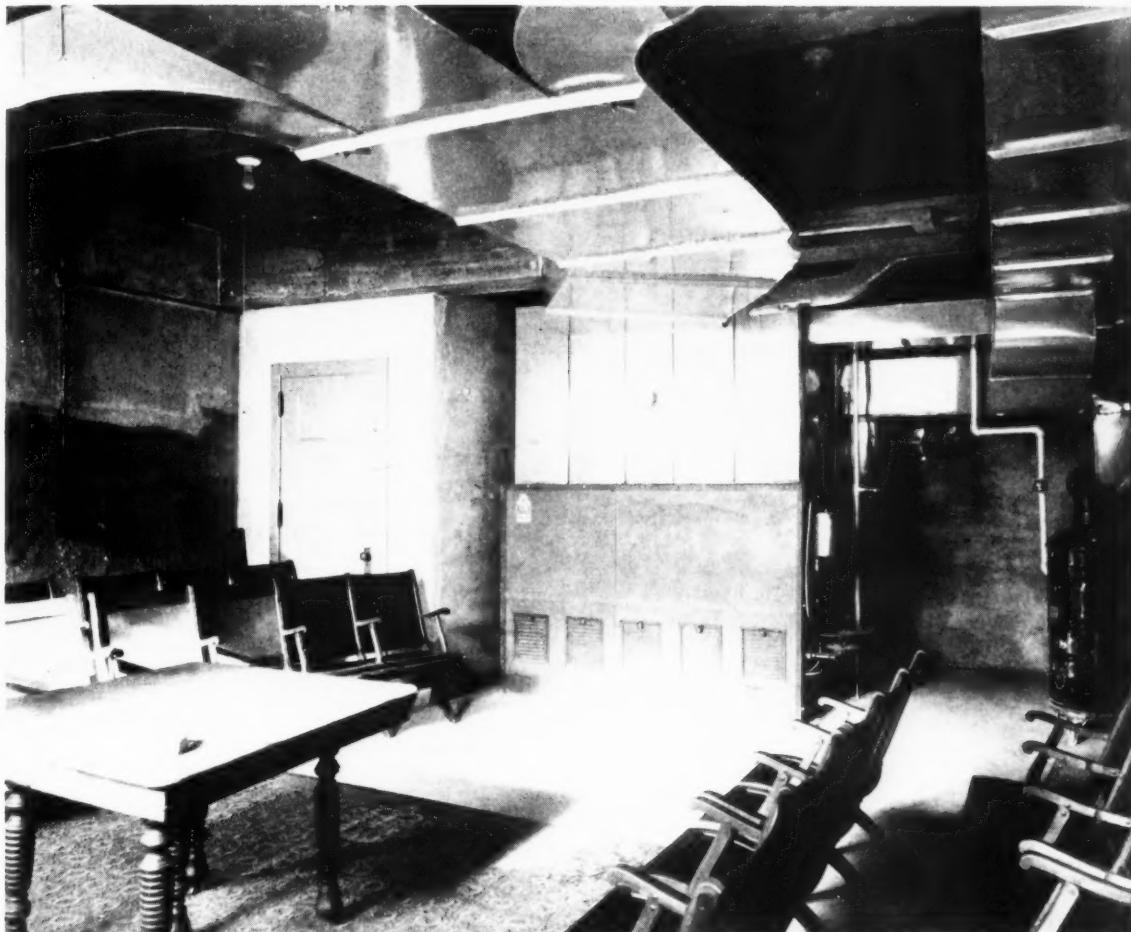


American Artisan

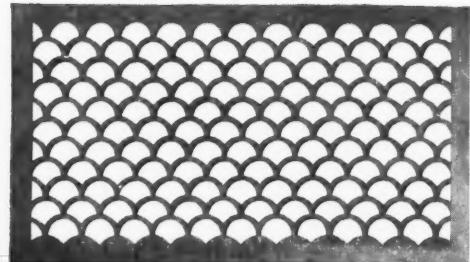
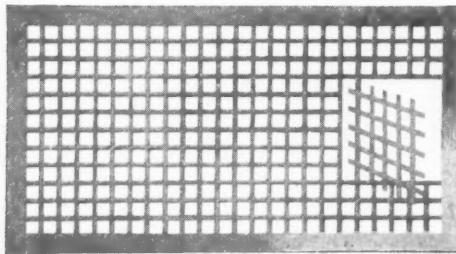
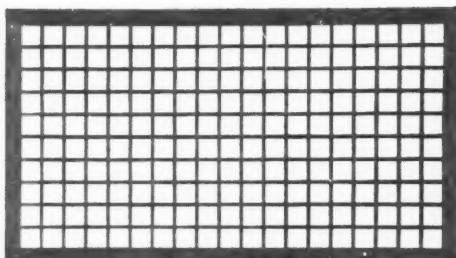
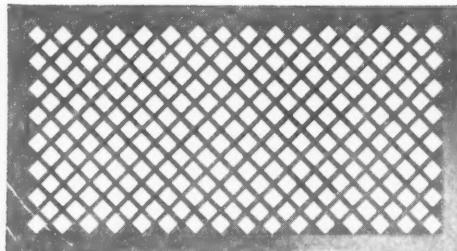
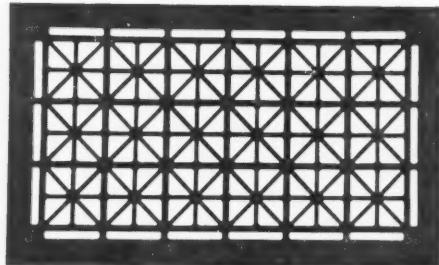
THE WARM AIR HEATING
AND SHEET METAL JOURNAL
FOUNDED 1880



“Tailored” to the job well describes this excellent warm air heating plant installed in a small church in suburban Pittsburgh. Attention is directed to the high plenum chamber with trunks and ducts coming off at right angles, the painted metal work, and the neatness of the whole plant. Details of this installation are in this issue.

MAY 25, 1931

INDEPENDENT



GRILLES

ANY SIZE.. ANY FINISH

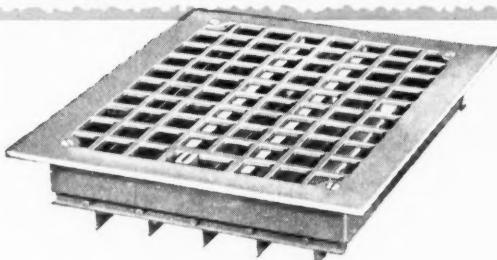
MADE to order of wrought steel brass or bronze to suit any specification. Available in a variety of artistic designs. May be had without finish or in any kind of finish. Quick service on all orders.

*Write us regarding
your requirements.*

**INDEPENDENT REGISTER
& MFG. COMPANY**

3741 EAST 93rd STREET • CLEVELAND, OHIO

WROUGHT STEEL REGISTERS



Any Independent grille can be made into a complete register with valves or louvers, as shown above.

You can depend on Independent for all your needs in Registers, and "Fabrikated" Cold Air Faces and Grilles.

P

1921

DAI
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Progress Sets the Pace



"Captures the Heat Units"

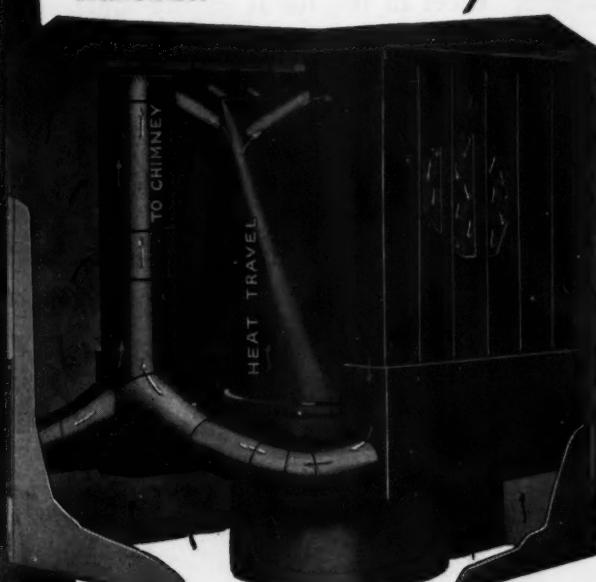
A Modern Convection Heating Unit

Your most important task is to give your customers a heating system that has set the pace with progress.

The Lansing Sav-Oil Furnace is the heating unit that sets that pace.

A startling development, a furnace which operates economically, efficiently and satisfactorily with oil or gas fuel at a cost approximate that of soft coal.

If you desire to progress with progress, line up with the Lansing Sav-Oil Furnace. Investigate our unusual dealer franchise.



Rear View—Patents Pending



Front View—Casing Cut Away

OIL
OR
GAS
BURNING

The Lansing Sav-Oil Furnace is not an experiment; it's a tested, proven unit. A two years test under actual home heating conditions.

Note the illustrations. The front view with the Rock wool blanket. An exclusive save fuel Sav-Oil feature.

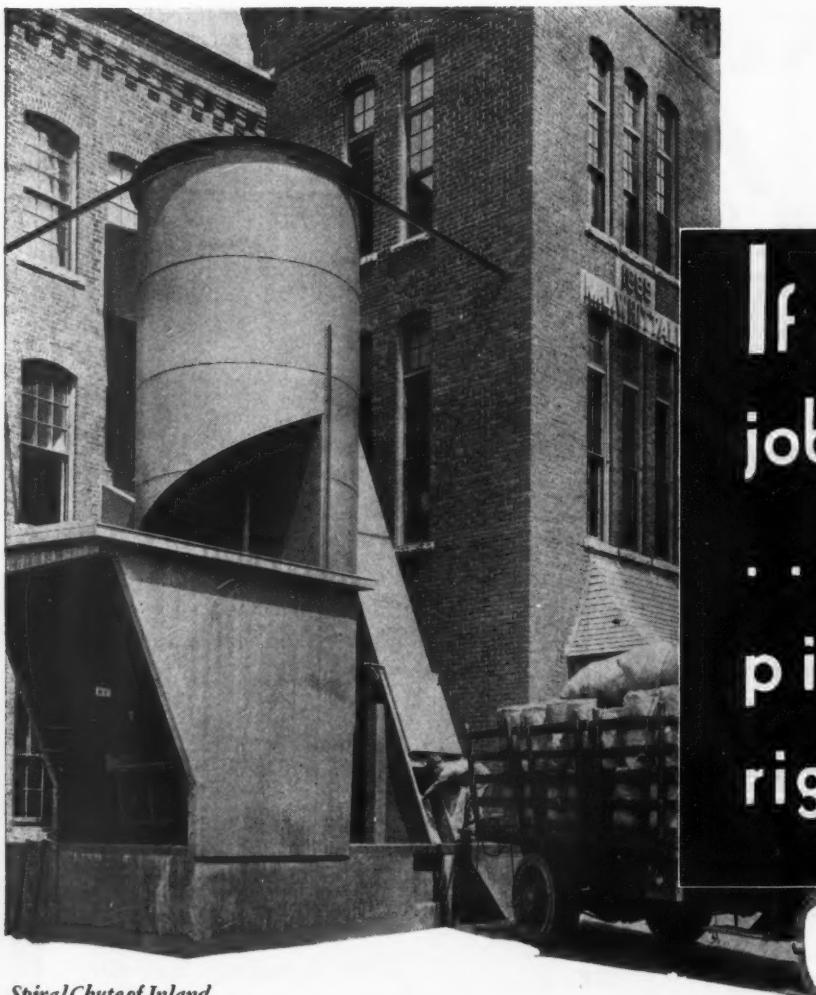
The rear view which shows the gas travel (white arrows) and air travel (black arrows). It's the air scrubbing the 17,280 square inches of radiating surface that makes the Lansing Sav-Oil the efficient low fuel consuming furnace.

WRITE TODAY

For Complete Data and Dealer's or Distributor's Proposition

DAIL STEEL PRODUCTS CO.
1050 MAIN STREET  **LANSING, MICHIGAN**

Published Every Other Week by Porter-Spoofford-Langtry Corp., 139 North Clark Street, Chicago, Illinois. AMERICAN ARTISAN—the Warm Air Heating and Sheet Metal Journal—entered as second class matter, January 29, 1930, at the Post Office at Chicago, Illinois, under the act of March 3, 1879. Formerly entered on June 25, 1887, as American Artisan and Hardware Record.



Spiral Chute of Inland Copper Alloy Steel Sheets at the plant of the M. J. Whittall Company of Worcester, Mass.

**Save
with Steel**



GOOD sheets and other materials, properly chosen, are the first essential in pleasing the customer. Because in his eyes no amount of good workmanship can cover up materials poorly chosen for the job.

If you want every contract to be a boost to your reputation and a bid for more business, you must start the job by choosing the materials best suited for it.

By standardizing on Inland as your source of supply you can be sure of getting the proper steel needed for the

If you want the job to end right . . . start by picking the right material

purpose . . . you can be sure that every sheet in the lot is of the same high grade . . . because Inland controls every part of steel-making from mine to sheet; because on every problem it brings to bear almost 40 years of experience; and because its plant embodies complete research and manufacturing facilities, and the most modern methods.

Inland men will work with you on every specification—Inland sheets will work for you on every job.

Sheets
Bars
Bands

Plates
Structurals

INLAND
ABLE SERVANT OF THE CENTRAL WEST
STEEL

Rails
Track Accessories
Rivets
Billets

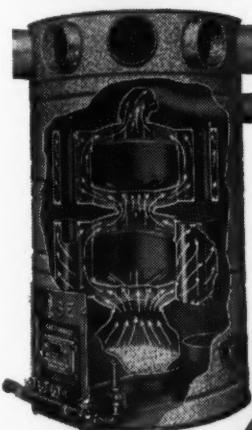
Say you saw it in AMERICAN ARTISAN—Thank you!



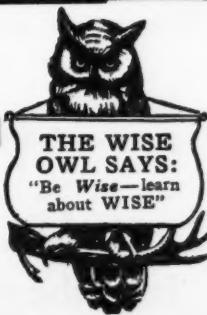
WISE 20 SERIES



WISE 40 SERIES



WISE GAS FIRED



Know The WISE BALANCED Line

Here is the **BALANCED** line that is bringing profits and leadership to WISE dealers everywhere.

A great line engineered for service and satisfaction.

3 Big Series to fill every price range—backed by WISE merchandising plans.

"Be *Wise*—learn about WISE."

BE
WISE
WRITE
FOR THESE

BOOKS

"Wise Dealers are **WISE** Dealers"

The **WISE** FURNACE CO.

AKRON, OHIO

Mention *AMERICAN ARTISAN* in your reply—Thank you!

It is the pure Iron alloyed with the right amount of Copper that gives **GOHI SHEET METAL** its lasting and rust-resisting qualities. It is the *one* metal you can safely trust under the most severe corrosive conditions.

Developed and manufactured exclusively by

The Newport Rolling Mill Company
Newport, Kentucky



Sheet Metal Building Materials for Every Purpose

Since 1885, the name GLOBE on sheet metal building materials has been the guarantee of highest quality.

The basic superiority of GLOBE products lies in the metal itself, which has the inherent qualities that resist corrosion and weather, as demonstrated through more than 45 years of service.

Sheet Metal Products, bearing the GLOBE brand, are available for every building requirement:

Eaves Troughs and Conductor Pipes, in all styles and sizes and with the correct fittings; V-Crimp Roofing; Roll Roofing; Ridge Rolls; Valleys; Shingles; Siding; Ceiling—these are but a few of the many GLOBE items carried in adequate stocks for immediate shipment.

ALL GLOBE Sheet Metal is guaranteed to meet all standard specifications. It is the assurance of dependable, low-cost-per-year service.

*Build business and reputation on
GLOBE quality Products. Write to-
day for complete catalog*

THE GLOBE IRON ROOFING & CORRUGATING COMPANY

Cincinnati, Ohio



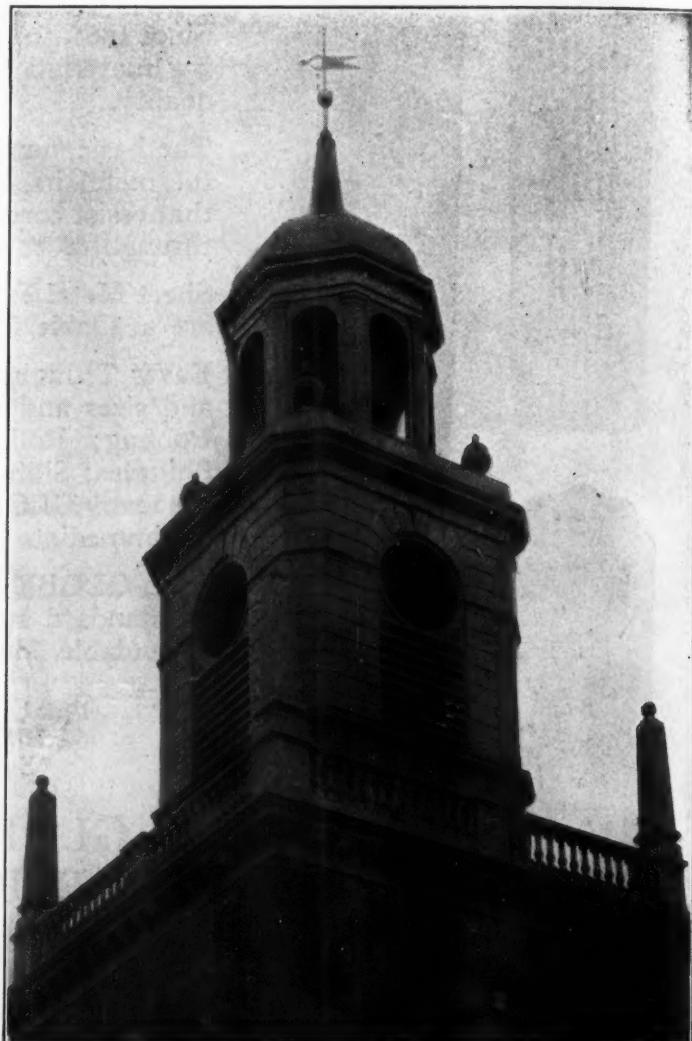
Mention AMERICAN ARTISAN in your reply—Thank you!

From flag-staff to brickwork ANACONDA COPPER

THE ORNAMENTAL character of this tower presented a problem in fabricating. The execution of the siding, the urns, columns and other copper parts is an excellent example of the craftsmanship of Ph. Christmann & Sons, and of the workability of Anaconda Copper.

In all, approximately 20,000 pounds of Anaconda Copper were used on the entire building for tower, gutters, leaders, louvers, valleys, ventilators and deck. About 8,300 pounds of 20 oz. copper was used on the tower. For the remainder of the installation, standard 16 oz. copper was used.

Manufactured with the highest metallurgical skill, Anaconda Sheet Copper possesses a uniform flatness, gauge and temper. Its consequent workability and its unvarying high quality are due to the exacting care accompanying each step in its manufacture—from mine to finished product. The American Brass Company, General Offices: Waterbury, Connecticut.



Tower of the State Teachers College Building, Buffalo. Sheet metal work of Anaconda Copper fabricated and installed by Ph. Christmann & Sons.

ANACONDA COPPER



Look for the name ANACONDA in every sheet and strip. Leading Supply Houses carry it.

Say you saw it in AMERICAN ARTISAN—Thank you!

If Furnace Men Only Realized the Market that has been Created for Air Conditioning!

MILLIONS—we mean just that—millions of home owners have been sold on the merits of air conditioning.

They have been reading for several years now the educational articles which have been appearing every month in the leading magazines.

The contractors' and builders' publications, too, are telling the air conditioning story to the trade.

Here is a great buying public, waiting for intelligent, energetic furnace men to come along with a good air conditioning system for the home.

Here is the Moncrief Aristocrat, that, equipped with air conditioning devices, makes as fine a system as one could ask for, at a price surprisingly low.

The Aristocrat is the furnace that you can get business with these days, business that will pay you a profit and generate good will for you forever afterwards.

Here is your chance, furnace men. We have a cheering, profit-making story to tell you. If you are willing to listen to something that sounds like real money, we are ready to give you all the particulars.

THE HENRY FURNACE & FOUNDRY CO.

3471 East 49th Street, Cleveland, Ohio

*Series "C"
Cast Furnaces*

*Moncrief
Steel Furnaces*

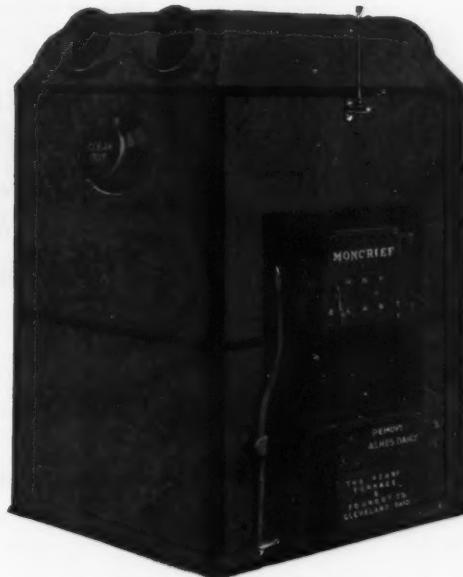
*Moncrief
Air Conditioning
Gas Furnaces*

*Moncrief
Pipe and Fittings*



*Finished in Cardinal Red

Series "C" Cast, or Steel. Burns any fuel. Fitted with Moncrief-Sphinx Gas Conversion Burner. Moncrief Blower, automatic humidifier and other automatic controls, it makes an efficient, economical air conditioning plant.



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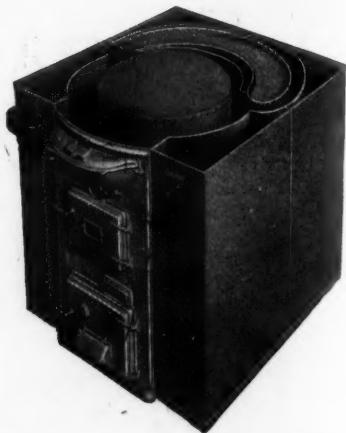
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Mention AMERICAN ARTISAN in your reply—Thank you!

THERE IS NO SUBSTITUTE FOR EXPERIENCE



In August of this year, the WEIR STEEL warm air furnace will become fifty years old—a Golden Jubilee Anniversary!

Into those fifty years has been packed EXPERIENCE such as no other furnace manufacturer can boast—ample reason for the preference the WEIR enjoys today.

And of EXPERIENCE (from another angle) we are pleased to direct attention to the fact that their "Experience" with the WEIR and its makers has held many of our dealers to a happy and profitable business connection "year after year after year."

**THE MEYER FURNACE COMPANY**
PEORIA, ILLINOIS

Say you saw it in AMERICAN ARTISAN—Thank you!

From
 Boston State House
 to
 Grand Central



IN 1798, atop Beacon Hill, Boston, the new state house stood completed. And yet not completed, because its dome was entirely of wood.

In 1802, the commissioners decided to "secure it forever from the danger of fire and the effects of weather." This was done . . . the dome was sheathed in copper sheets . . . the first copper sheets from America's first copper-rolling mill . . . Revere sheets from the mill of Paul Revere!

In the century and a quarter that followed, each succeeding generation has used Revere copper, brass and bronze in perpetuating its architectural monuments.

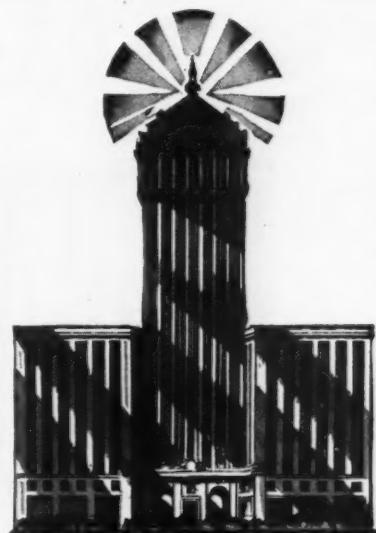
+ + +

In 1910 began the development of the Grand Central Terminal zone in New York City. The spreading Terminal itself has a 4-acre roof of Revere copper. In the New York Central Building, astride Park Avenue, the copper roofing and

flashings are from Revere mills. Revere copper, brass and bronze products were used in the Graybar Building, the 51-story Lincoln Building, the Bowery Savings Bank, the Daily News Building and many others.

+ + +

Revere's first mill has grown. Today, Revere Copper and Brass Incorporated owns seven mills. They comprise 50% of all the copper rolling-mill facilities of the country. They include the two largest sheet-copper mills. They are carrying on in the Revere tradition serving the building and sheetmetal trades just as Revere served them a century and a quarter ago.



Revere Copper and Brass

INCORPORATED



Baltimore Division, Baltimore, Md.

Dallas Division, Chicago, Ill.

Michigan Division, Detroit, Mich.

Taunton New-Bedford Division, Taunton, Mass.

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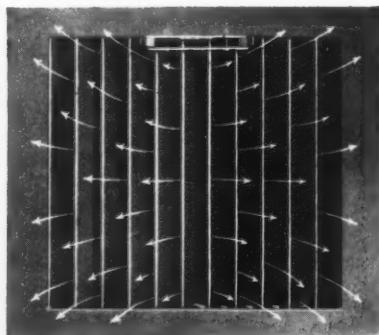
EXECUTIVE OFFICES: NEW YORK CITY

GENERAL OFFICES: ROME, N. Y.

Mention AMERICAN ARTISAN in your reply—Thank you!

**A Simple
"Twist of the Wrist"
for
Diffused or Concentrated
HEAT**

Here's a real improvement in registers, the new Waterloo DIFFUSER. A twist of the wrist and the register is adjusted to diffuse or spread the heated air evenly over the room, or by the same simple operation the heat can be concentrated to one point. Adopt the improved type register: Waterloo "Diffuser."



WATERLOO
WAFER TYPE WALL
REGISTER

No explanation is necessary as to Waterloo registers. You know their quality, their standard. But now they are even better than ever with the new Diffuser feature.



WATERLOO
BASE BOARD TYPE
REGISTER

There is a Waterloo register for every job. Side-wall, floor, ceiling or base board. All Waterloo registers "Close" tightly giving all smooth surface which is easy to clean.

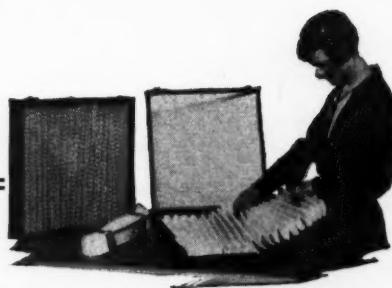
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WATERLOO REGISTER CO.
Waterloo, Iowa

822 Clanton Street
Los Angeles, Calif.



2211 First Avenue
Seattle, Wash.

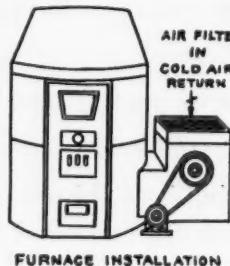


**No More "Washdays"
With a
"KRIMPAK" AIR FILTER**

When the "KRIMPAK" Accordion Type Filler Is Dust and Dirt Saturated, Just THROW IT AWAY—

"Krimpak" filters are so low in cost it just doesn't pay to renovate them; just throw them away.

The filters come in a compact package expanding when removed accordion fashion. Easy to replace without soiling the hands.



**Be Prepared to Give
Your Customers
the Facts About
"KRIMPAK"**
The New Dry Fabric Filter

The filter medium is a reinforced dry fabric which stops even the microscopic particles so objectionable in warm air heating systems. The deep crimping gives it five times the usual surface area, resulting in low resistance and long periods between changes—three to four months on average jobs. And when you make the change you start again with a new filter.

WRITE FOR COMPLETE
DESCRIPTIVE CIRCULAR TODAY

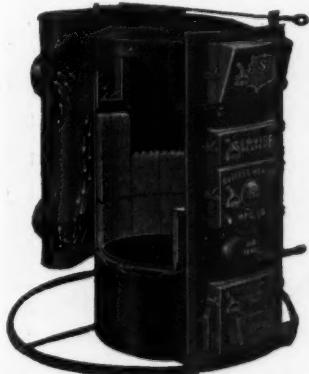
INDEPENDENT AIR FILTER CO.

29 SOUTH CLINTON STREET
CHICAGO

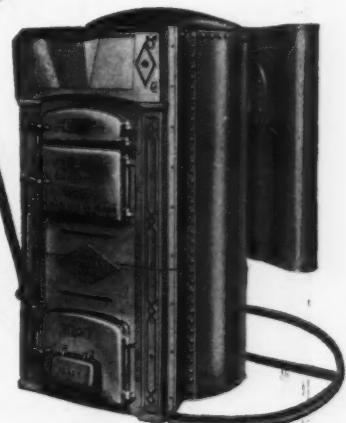


CENTRALIZED - - PRODUCTION -

*forms the Background
of Business Success
for You . . .*



[SUCCESS
MIDLAND]



[MIDLAND
EL CAPITAN]

• COLUMBUS •

Combined resources, policies and engineering knowledge—all contribute to a dealer's success.

Add to this centralized production and a greater contribution towards success is made.

Then make a further and still greater contribution,

BASIS QUALITY PRODUCTS

and a dealer has not only the background of success but an indissoluble foundation on which to build for business success.

Such contributions MIDLAND has made, first, in acquiring the Success Heater Manufacturing Company and combining its resources with that of its own, next by centralizing production of the products of both companies, and then by presenting a Quality Steel Group of outstanding merit and value. Avail yourself of the Foundation to Business Success. Write for details.

MIDLAND FURNACE COMPANY

COLUMBUS, OHIO

DES MOINES, IOWA

Mention AMERICAN ARTISAN in your reply—Thank you!

A BETTER HEATING JOB ▼ THROUGHOUT ▼

Very little need be said. Every furnace man knows that it's to his advantage to install "A BETTER heating job." And he *should* know that he can always do a job just a little *better* with one of May-Fiebeger Units.



AKRON
AIR BLAST
FURNACE

Why not write today and let us tell you all about the Akron Air Blast and the other units that comprise the May-Fiebeger line. All about a single unit which gives "Air Conditioning."
Do it now.

The MAY-FIEBEGER COMPANY
NEWARK
OHIO

“SILENT”
will help YOU
put warm air in homes like



Residence of L. J. De Lamarter, Grand Rapids—one of thousands of beautiful homes in which Silent Automatic (in connection with forced air systems) has helped heating engineers make substantial, profitable installations.



AUTOMATIC oil heat is the key that is opening the doors of fine homes to the warm air man today. And it is safe to say that the greater warm air market of tomorrow will be an oil burning market.

Facts support these statements. Four years ago, not more than 5% of the Silent Automatics sold were installed with warm air furnaces. Now, in centers where warm air heating is firmly entrenched, this proportion has increased to 40 and even 50%.

Every year more and more home owners want the advantages of warm air heat and

the highly improved warm air systems now available. But they are insisting, at the same time, upon the cleanliness, dependable operation and freedom from furnace tending which Silent Automatic insures.

Homes in which "Silent" and warm air are being installed offer the most desirable class of business in your field. Mail the coupon today for the facts about this opportunity, which enables you to make two sales and two profits in one.

SILENT AUTOMATIC CORPORATION
 12001 E. Jefferson Ave., Detroit, Michigan

For Warm Air, Steam and Hot Water Heating Systems—Old or New Homes

SILENT AUTOMATIC!
 THE NOISELESS OIL BURNER!



Made by the World's Largest Producer of Domestic Oil Burners

C O U P O N

Name _____

Silent Automatic Corporation, Detroit, Michigan

Please send me, without obligation, a copy of your booklet, "Oil Heat for the Warm Air Furnace", giving information on the installation of Silent Automatic with warm air systems.

Street _____

City _____ State _____ (394)



All Silent Automatic models listed as standard by Underwriters' Laboratories

Mention AMERICAN ARTISAN in your reply—Thank you!

GILTEDGE

FURNACE

**The Furnace with a GOOD Name and
A Company with a GOOD Reputation
Now!**

**BETTER AND STRONGER THAN EVER
REORGANIZED ▼ REFINANCED**

The Schwab Furnace & Manufacturing Company will continue, as in the past, to make its product of such unusual high quality as to always merit the trade name "GILTEDGE" and to continue the program of unexcelled service and cooperation to furnace dealers.

The name GILTEDGE on a furnace is the surety of satisfaction.

SCHWAB FURNACE & MFG. COMPANY

Milwaukee Sales and Warehouse
522 WEST CHERRY STREET

Gen. Offices and Factory
CEDAR GROVE, WISCONSIN

*Write for our catalog
and dealers' profit-sharing proposition*

A Portable, Self-Firing, All-Purpose Oil Heater

— With Patented Oil Pilot —

for year-round profits

SELL IT NOW for summer cottage, hunting lodge, or brooder house. Sell it ANY TIME, anywhere, for store, filling station, home garage or work room. Quick, easy sales—clean profit in the



42" high—16" diameter

NORTHERN
Junior
Oil Heater

Burns distillate with thorough combustion. Not dependent on gas or electric service. No moving parts. **NO WORK, NO DUST, NO ASHES, NO NOISE.** Clean, portable, *uniform* heat, with no attention. Equipped with Automatic Draft Regulator. Can be furnished with or without a 6-gallon tank attached. Safe, Silent, Economical, Efficient. No "dull season" with the NORTHERN. Write or wire for literature, prices and discounts.

NORTHERN OIL BURNERS, Inc.

Also Mfrs. of NORTHERN AUTOMATIC (Household) OIL BURNER
2441 Hennepin Avenue Minneapolis, Minn.

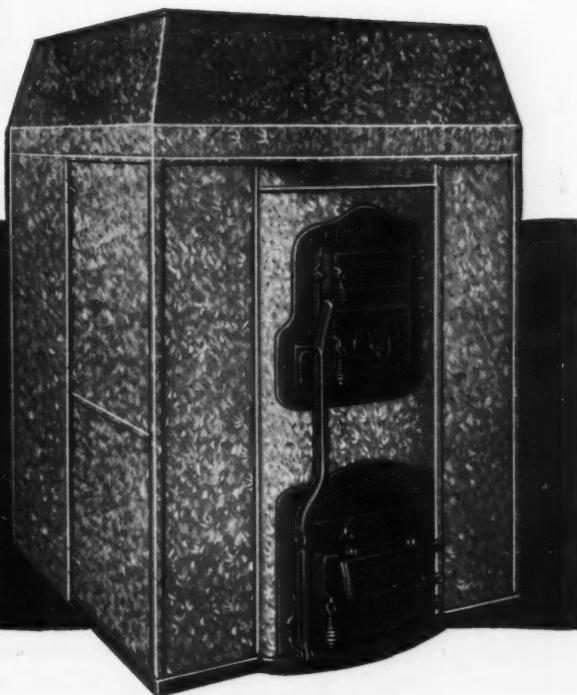
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FRONT RANK

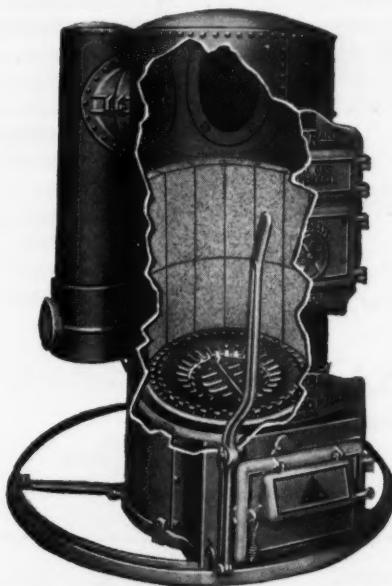
Announces to the Trade



To round out the line and give dealers a complete range of heating systems to meet every condition, Front Rank now adds the new Super Air Heating System. This new unit marks the greatest step forward ever made during our entire 43 years of experience. It offers you many strong selling points with which you can capture your share of 1931



business in the face of the keenest kind of competition. The well known, thoroughly proved Front Rank furnace construction can now be had in the new and popular insulated square casing. The system is equipped with silent, forced-air fan, air filters, automatic humidifier.



AND THE NEW FRONT RANK DUPLEX GRATE

The new type grate permits more accurate control of drafts, the use of finer sizes of fuel, simplifies clinker removal and eliminates stooping to shake.

The new Front Rank Super Air Heating System is the type of plant that will be in strongest demand in 1931. Write for details of the Front Rank Franchise and Dealer Plan.

A WORD ABOUT THE FRONT RANK RECEIVERSHIP

Due to certain unusual conditions, the Langenberg Manufacturing Company is being operated under a receivership. This is an operating receivership and is *not* for the purpose of liquidation. Neither is it the result of any creditor's

action. It is simply a temporary expedient which will enable the firm to make more rapid progress and offer a still higher quality of service and merchandise to its dealers.

JNO. T. HICKS, Receiver for

LANGENBERG MFG. CO., ST. LOUIS, MO.



This book, prepared by the Trade Development Committee of the National Sheet Metal Contractors' Assn., represents years of effort in its compilation and is authoritative and complete.

THE IDEAL BUSINESS BUILDER

For You—for the Architect

An Authoritative Reminder of Metal's Many Uses

IT covers every branch of the sheet metal industry including warm air furnace heating.

It illustrates and describes the Standard Practice of constructing and installing *all* sheet metal work.

It is the only authority on Standard Practice to which you can refer for reliable data.

It will earn its cost the first day you have it in your shop.

It belongs in every Sheet Metal Shop and in every ARCHITECT'S office.

Get your copy now and you'll see why it will pay you to present a copy to at least one architect in your town. With this book in his office the architect has a RELIABLE, AUTHORITATIVE source of reference to aid him in specifying sheet metal work.

ARCHITECTS CAN'T SPECIFY WORK THEY DON'T KNOW ANYTHING ABOUT—THIS BOOK TELLS THEM AND SHOWS THEM HOW TO SPECIFY QUALITY SHEET METAL WORK OF EVERY NATURE.

The book contains 768 9x12 pages—
494 pages of illustrations and 274
pages of text.

Price \$10.00 postpaid

Order through the Book Department of

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139 North Clark Street Chicago, Ill.

Book Department,
AMERICAN ARTISAN,
139 North Clark Street, Chicago.

Enclosed is \$..... for which please send me copies of "Standard Practice in Sheet Metal Work."

Name.....

Address.....

Town.....

State.....

**Use the Coupon
to Order
at Least One Copy, Today**



**Will They Listen?
Will They Look?
Will They Buy?**



WESTERN GAS FURNACE

Will home owners listen when you speak
of clean, usable basements?
of an automatic fuel supply?
of trouble-less heat in any season?
(no shoveling—no ashes—no flues
to clean—no drafts to watch)

Will they look when you show them the attractive Western GAS Furnace?

Will they buy when you tell them of its fault-less construction?

The Western GAS Furnace has all the latest developments of gas heating. Can be operated by either manual or automatic control. Welded from fire box to dome. Lacquered finish or galvanized. Approved by the American Gas Association.

Write for details

For Southern Distribution

WESTERN STEEL PRODUCTS COMPANY
521 Westport Avenue
KANSAS CITY, MO.

WESTERN STEEL PRODUCTS CO.
130 Commonwealth Avenue :: :: :: Duluth, Minnesota

Say you saw it in AMERICAN ARTISAN—Thank you!

Founded 1880

American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNAL

Covering All Activities

IN

Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Industrial Roofing
Merchandising
Ventilating

There is a pretty complete report of the twenty-seventh annual convention of the National Sheet Metal Contractors' Association in this issue. If you couldn't attend the meeting we strongly recommend this report to you since it contains some vitally important business matters.

One of the finest and also one of the largest copper jobs of recent months is almost completed now in Chicago. It is the re-roofing of the World's Fair Fine Arts Building which many of the old timers will remember. There is some mighty sweet copper work on this building—in fact, just the kind of a job every contractor dreams about.

We would like to have you begin the series on electric motors. The first article in this issue. There is some mighty important information to follow and you should get the background before the series swings into its stride.

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Editor

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Volume 100

American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNAL

Number 11

'Ifs' and 'Ands' from the Convention

THE national annual convention of the sheet metal contractors held last week in Chicago was certainly difficult to analyze from the standpoint of trying to find out how business looks for the rest of this year.

Delegates and individual members from some parts of the country reported business fairly good and encouraging for the rest of the year. Men from communities not far from these reported that business was rotten and looked as though it would get even worse.

There didn't seem to be any real reason for either reports. Perhaps it is such a situation which has led our business prophets into such a mess of prediction, most of which has proved "all wet."

If we may do a little business guessing ourselves, it would be to say that the contractor in the small town has been harder hit than the brother in the larger community. And right now we know that there are dozens of contractors in large cities saying that we are about as good a predictor as the rest of the tribe, for in their community business simply couldn't be any worse. Right. We grant this.

Nevertheless, close investigation shows that in the small community the activities of the sheet metal contractor are limited. He doesn't have large office buildings using ornamental metal work; nor does he have industries which are always replacing or repairing or erecting new departments or buildings. There isn't much room for specialty effort, for the user is usually in another city. So his work is confined mostly to residential metal, with perhaps some blowpipe jobs, such units as the marquee for stores, metal ceilings, and caponies.

The large town contractor, on the other hand, if he isn't restricted too much by labor conditions, can do some ventilation work; there are always new restaurants and stores and buildings opening up needing ventilation; he can do some promotional work among the architects to stir up interest in the use of ornamental metal which may lead to a job; he can look over the field of specialized fabrication and solicit such work

among the industries of his part of the state. There is, in addition, proportionately more of the kind of work the small town contractor does which he can go after.

If we wanted to draw a conclusion here, it would be that the large town contractor is better situated than the contractor in the small community.

But let's not draw such a conclusion—for it probably would be wrong. First, because there are lots of small town contractors who do really big work in every state of the Union. There are hundreds of large town contractors who never get a job amounting to more than \$200. When business is good, both seem to get a share of work, but when business is bad they both suffer.

So, instead of drawing our conclusion according to size of home city, let's make it this way—it all depends upon the initiative of the contractor. Where he is located doesn't matter so long as he has the energy, the ability, the financial standing, and the confidence to go out and bring the work home.

That, readers, is the conclusion on business depression we would draw. And we are glad to say that, after all the smoke of the convention cleared away, that seemed to be the thought most of those attending took away with them.

We can't kid ourselves that business is good. Or that business will right itself without any help from us. It is absolutely fatal to sit down and wait for business to pick up, for it probably won't until the aggressive men go out and start the ball rolling.

There isn't an industry in the country without these aggressive leaders. Most of them are not loud talkers—they are the doers. Our industry has such men; most communities have such men among our craft.

And they will have to do it whether they want to do so or not. Such men simply can't sit idly by and see business go to the bow-wows without doing something constructive about it.

Let as many of the contractors as will start out to do some leading.



200,000 Pounds of Copper Used to Remodel 1893 Fair Building

HERE is nearing completion in Jackson Park, Chicago, a piece of reconstruction which has aroused nation-wide interest among architects and builders. This work is the renovation of the Fine Arts building of the Chicago World's Fair.

Old-timers in the sheet metal industry who visited that magnificent fair will remember the building. It was, in fair days, the largest and most imposing of all the vast assemblage of beautiful buildings which housed the exhibits. It was, when reconstruction began last year,

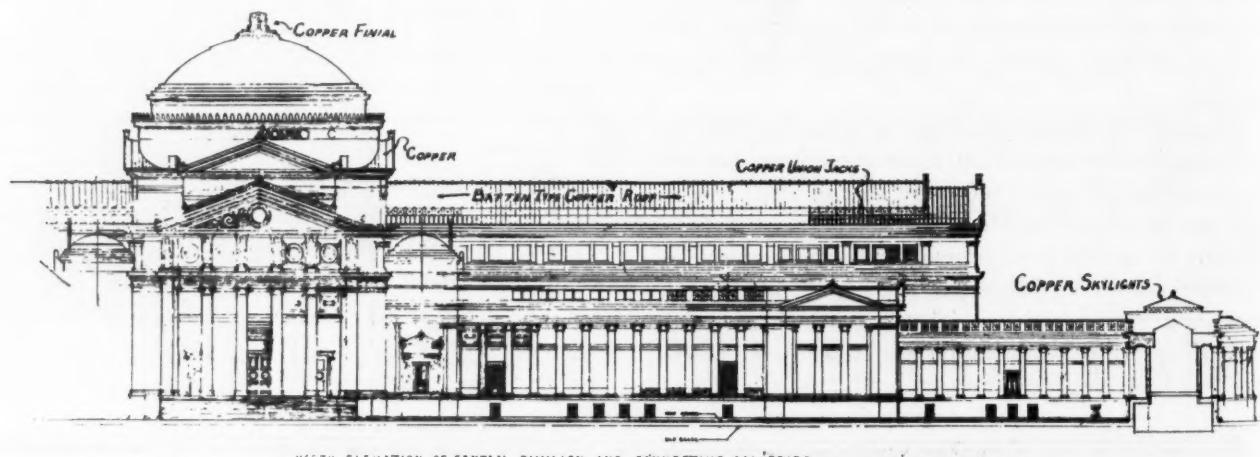
the last of the fair buildings. After the fair it housed the Field Museum and as such was the mecca for visitors from all over the world.

It was replaced a few years ago by a new museum building which now stands at the southern end of Grant Park and forms the hub of the present group of fine structures of which Chicago is justly proud.

Those who saw the building in fair times will remember the beauty of the building's exterior. But like all the other fair buildings, it had been erected as a temporary structure and its construction was not

permanent enough to withstand the weathering action of the years. The walls were brick with an exterior of stucco. These walls required constant maintenance and it was because of this decay that a new building to house the museum was erected. But the beauty of the building had always been a source of enjoyment to lovers of fine architectural design, and in spite of decay there has always been many persons who wished to see the building perpetuated.

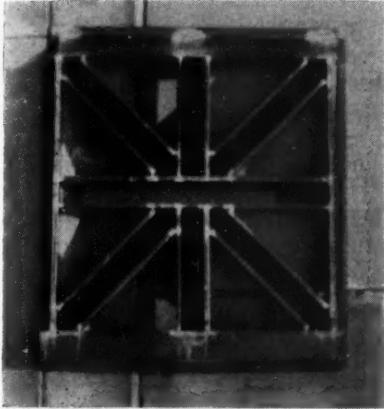
Just a short time ago plans were perfected under which the old



building was to be refaced on the exterior, provided with a new structural frame, and re-roofed permanently to house an industrial exhibit unlike any other project in the world.

Plans for the renovation call for a new exterior facing of stone, the perpetuation of the ornamentation in enduring stone, a new frame to carry heavier floors, and, most important of all from a construction standpoint, a new roof of permanent material. This new roof is now built of copper in place of the light built-up roof of fair days.

The photographs and drawings



Back side of a "Union Jack." There are 1280 of these on the job, all assembled in the shop

Soldering the ornamental ends to the monitor roof battens. The vertical face of the monitor is ornamented with "Union Jacks." Two sizes of battens were used. The small batten is on the monitor roof and the large batten where the workman is standing

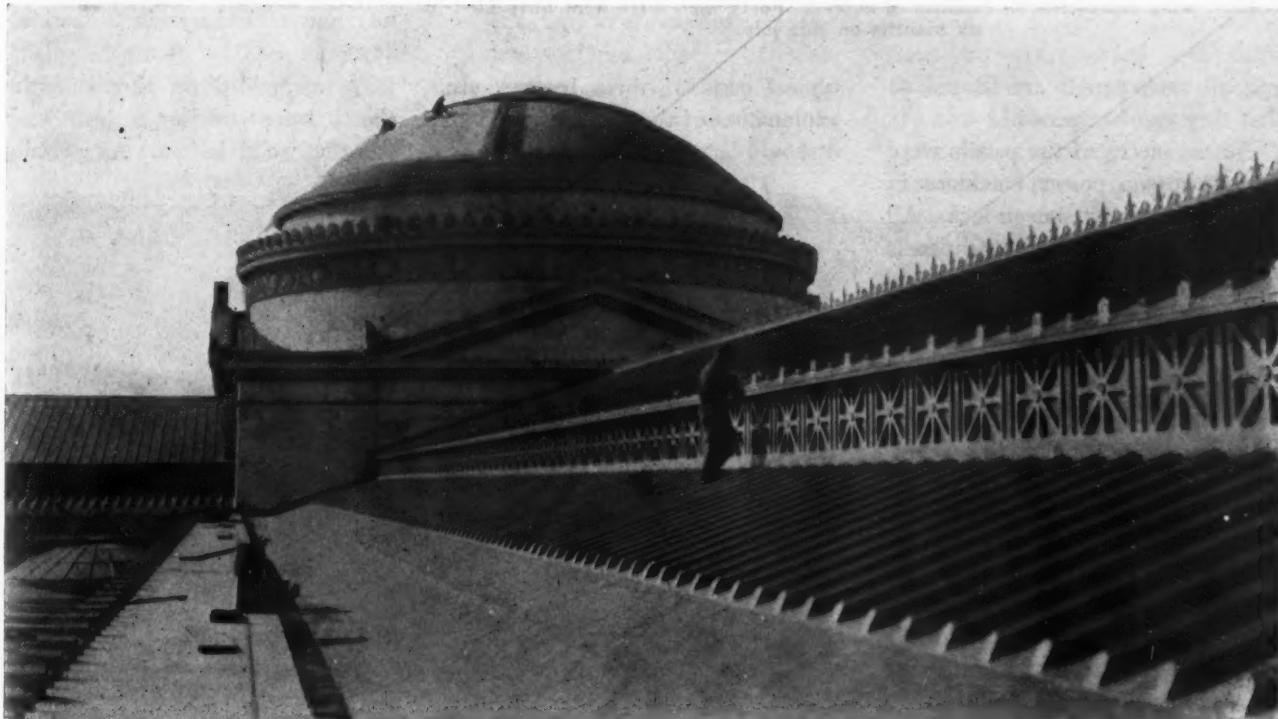


which accompany this article show all the important details of this copper roof. As will be noticed, there is a wealth of excellent detail and ornamentation of a high order. The copper work forms one of the largest copper projects of recent years.

In all more than 200,000 pounds of copper have been laid on the roof. The contractor who placed all this copper is the firm of Kitzelman Company of Chicago. More than 40 workmen were kept busy on the job for a period of six

months, not to count all the other artisans engaged in preparing the ornamental molds and final copper ornamentation.

The new roof is identical in outline with the old roof. The main crossing of the building is surmounted by a huge dome from which radiate two long wings east and west, one short wing to the north or main entrance and another short wing to the back or south. In addition, the ends of each of the east and west wings are connected

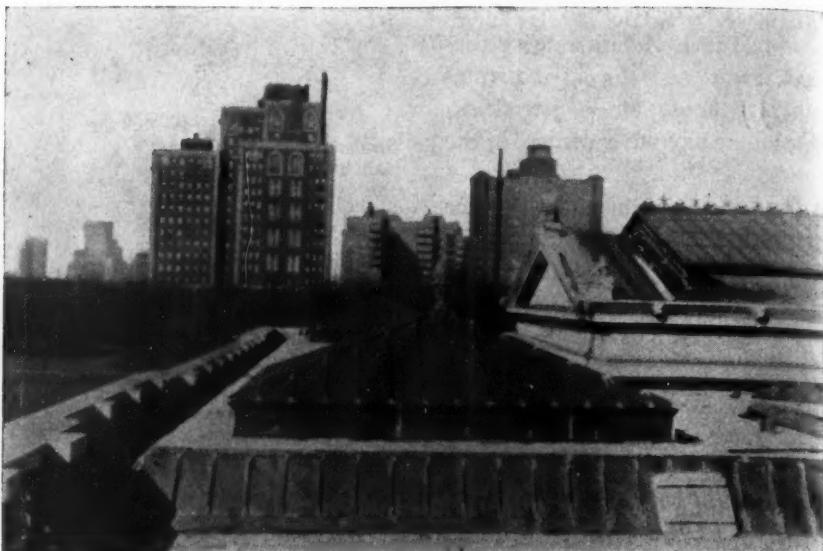


Looking down the roof of the east wing. The dome roof is tile but the top deck is copper. The wide gutter is faced with composition roofing with a wide protecting flashing sheet set in the stone

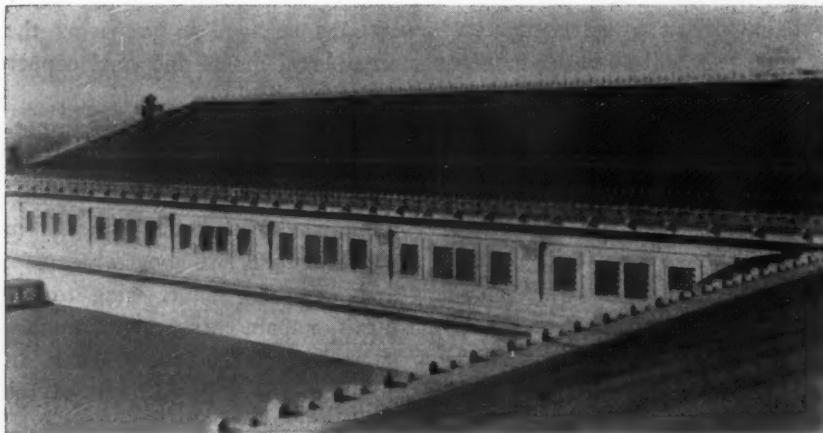
by arcades with smaller halls which are topped with smaller domes similar in outline with the main dome.

Some of the photographs show the details of the copper work on the two long wings. These wing roofs are of the monitor type with batten type roofs above and below the vertical face of the monitor.

Probably the most interesting detail of these monitors is the rows of vertical panels. The design of these panels is called Union Jack. Two types of panels were used, one type having a copper sheet behind the radiating arms, and the other having wire glass behind the arms. The glass panels are used in monitors where light is to be admitted,



Differences in roof elevation are faced with copper laid like batten roofing. Flashing is soldered to the pan sheets



Each wing represents an expanse of copper. Forty men were kept busy for six months on this job

and all such panels are hinged so that they can be opened.

All the pieces of the panels were formed up on power machines in the shop using Pittsburgh locks. All joints are soldered and the panels were delivered at the job completely assembled and ready to be hung.

On the job there are 1280 of these panels, and their fabrication and erection alone represents quite an item of labor and material.

The pitched roofs above and below these panels are all of the batten type. The batten used has cut back vertical faces to provide $\frac{1}{4}$ inch for expansion on each side. Some idea of the size of the roofs can be gained from the fact that there is more than 60,000 lineal feet of these wood battens on the job.

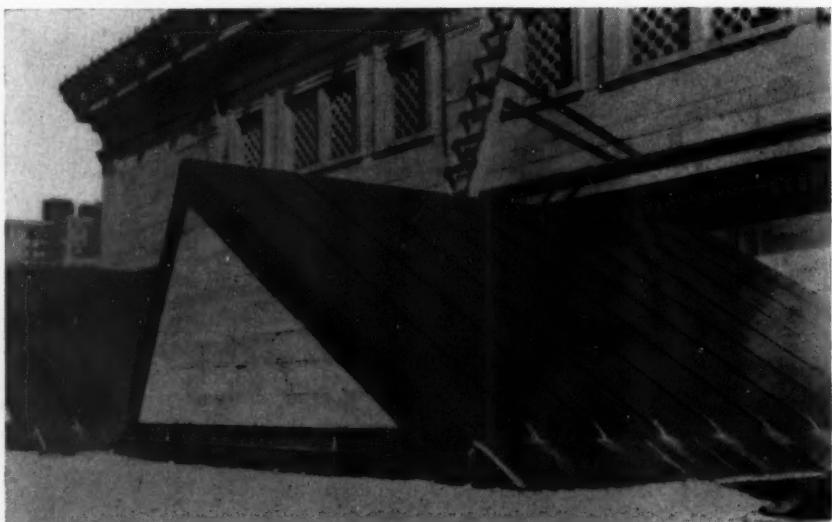
One of the photographs shows

typical ends of these battens. In explanation of the end construction, it should be pointed out that the pan

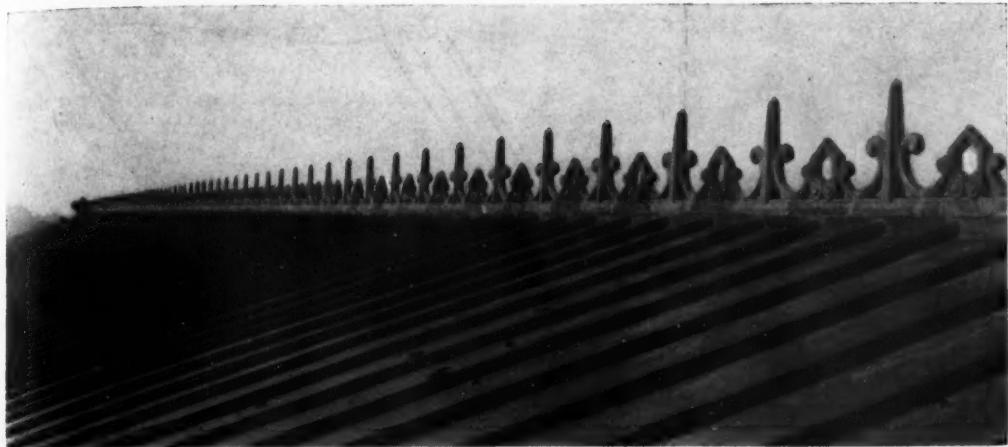
sheets used are of the self-capping type. One of the details shows a cross section of the pan sheet. This detail shows how each pan sheet carries up and over the batten with a turned-back edge for locking with the adjoining sheet.

It is interesting to note that all these pan sheets were formed on power machines using a wide die which allowed a completely formed sheet to be produced at one press of the machine. Under pressure this one machine die was able to turn out 600 sheets in a working day.

As assembled on the roof the sheets were cut just a little long for the wood batten. A specially



Sawtooth skylights are roofed with batten type copper. This also shows a detail of the copper flashing, of which there are hundreds of feet



The crested ridges are of ornate design. The work of fabricating, erecting and soldering all these sections represents much labor. The cresting was stamped by Milcor

formed end was pressed, and in assembling was held against the end of the batten while the long edges of the pan sheet were turned over this end and pounded down. These ends were not soldered.

A somewhat different assembly was used at the batten ends of the monitor roof. Here a similar end piece was used and the pan sheets again turned over this end, but in addition a specially formed ornamentation such as shown in one of the photographs was soldered to the batten sheets. These ornamentations alternate with high and low units. Their design was specially prepared and the pieces were stamped out by the Milcor Steel Company and shipped in boxes to the job.

The ridge rolls of these monitors are worthy of attention because of their design. One of the photographs shows a closeup of the ridge



This close-up shows the cresting sections. Also the heavy ridge piece and the soldered joint between battens and ridge. The ridge base is wood

and also shows how the ridge is composed of alternate high and low sections soldered together after assembly over a wood ridge piece. In one of the pictures showing the ridge, it can be seen that the battens

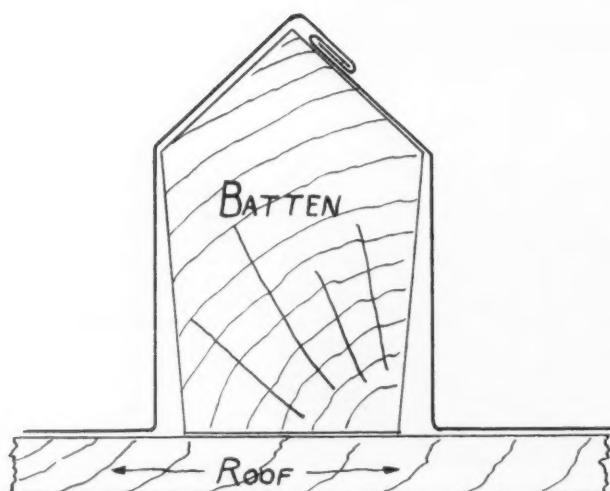
end against a ridge facing on which the roll is soldered. All connections between battens and ridge were soldered. These ridge castings are also Milcor stampings.

Another feature of the monitors is the use of corner ornamentations. The models for these were sculptured by McNulty Brothers, Chicago, from plans of the architects —Graham, Anderson, Probst & White—and the copper stamped by the Friedley-Voshardt Company of Chicago. These copper ornaments duplicate similar ornaments produced in stone and placed on the stone parapets of the roof decks.

The use of copper on the large and small domes is not extensive, but in every case is intricate. Especially so the large copper finial which finishes out the main dome. One of the details shows how this finial appears, and one of the photographs shows the molds for this



Looking down the ridge of the east wing from the main dome. Attention is called to the wide gutters and the duplication of the copper ornamentation in stone

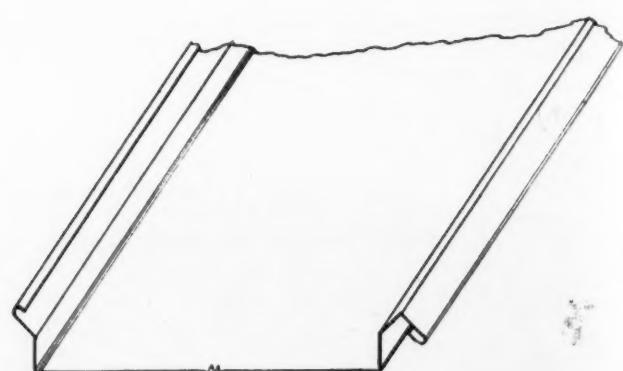


Cross-section of a batten and detail of the self-capping pan sheet

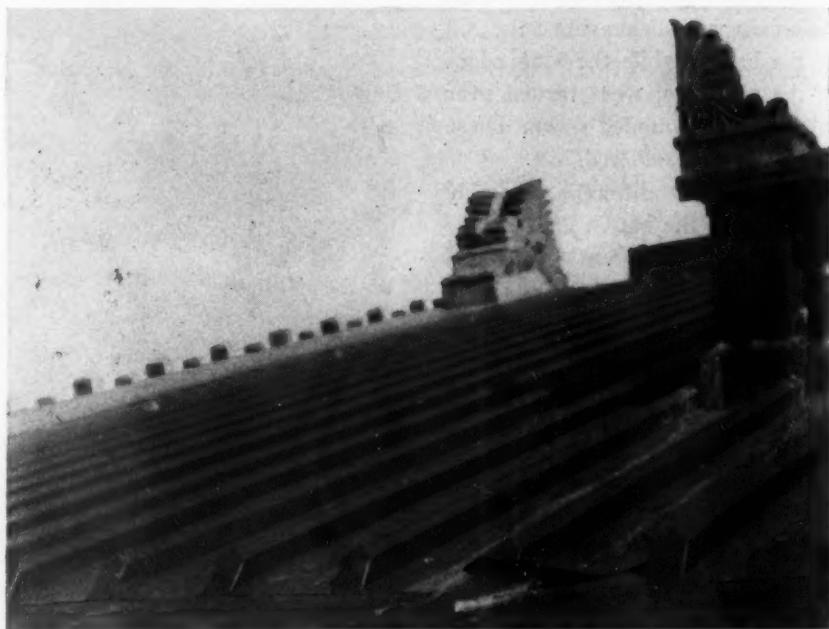
large ornament. This piece, again, was especially sculptured for the job by McNulty Brothers and the stampings made by Friedley-Voshardt and delivered to the sheet metal contractor in easily handled sections. These small sections were in turn fabricated into larger sections in the contractor's shop and delivered to the job in sections as large as could be conveniently handled on the dome. The completing work consisted of soldering the large sections together.

On this large dome, as shown on one of the details, there is a nearly flat copper sheathed roof below the base of the finial ending in a specially designed cresting. The roof is again batten type, while the cresting again was especially designed.

The finials on the smaller domes



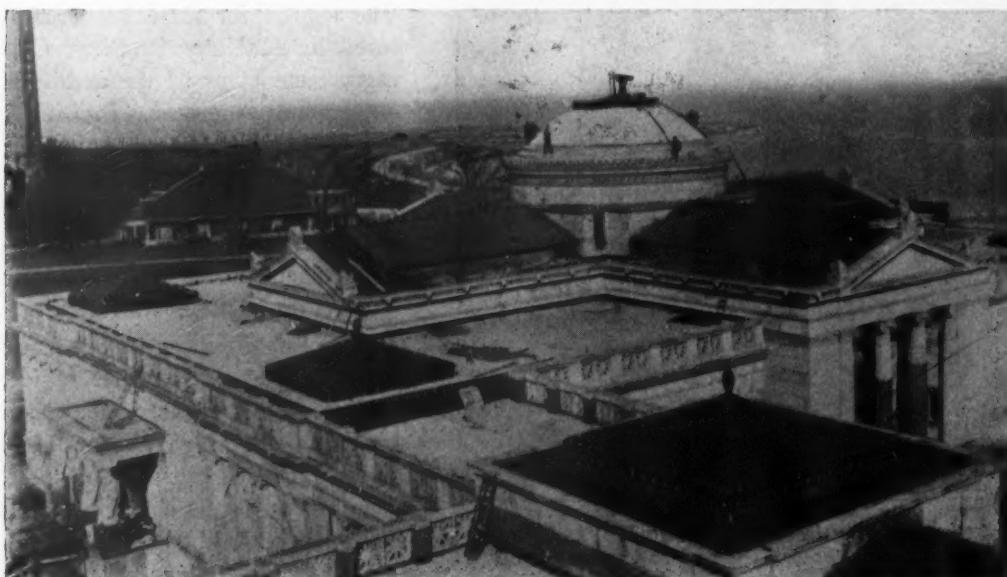
This is the formation of the pan sheet as it was formed by the power press. No cap was required. When necessary 600 such sheets could be formed in one day



do not duplicate the main finial, but have a design of their own. A cresting is used here, also, but there is no copper roof in between. These

finials and crestings and also the pineapple finials on skylights are the work of Friedley-Voshardt.

In addition to these intricate and



Above is a close-up of the batten ends showing the separate end sheets and turned over seam. These ends were not soldered. At the left is a view of the copper work on one of the wings. The finial is copper as is the roof of the monitors, the skylights and the vertical faces in the roof steps

large uses of copper, there is a large amount of interesting copper work over the job. For instance, each of the wings has five large skylights



capped with a pineapple finial and covered with batten type copper roof, with a glass paneled monitor underneath the roof. As shown in one of the pictures, these skylights set on raised bases with the vertical faces of these bases protected by standing seam copper. These sky-

Right—Models for the large finial which stands on the main dome. The fish is at the right, the pedestal and base sections at the left and in the foreground. Stampings were made by Friedley - Voshardt of Chicago

Left—The finial in place on the dome. The cresting at the finial base is copper. In the foreground is a glass section of one of the monitor roofs

lights are, in addition, ornamented by a row of copper cresting at the eave line.

To provide the utmost in protection, all the copper is laid on a 10-

year guaranteed asphalt roof, laid without any insulation. This part of the contract was done by the Chicago Waterproofing and Roofing Company.



Here are the molds used for the stampings of the small finials, the pineapples on the skylights, the monitor corner ornaments and other details. These were sculptured by McNulty Brothers from designs of the architects—Graham, Anderson, Probst and White.



One of the copper finials for the small dome. The cresting is copper as is the deck between the cresting and the finial

All the work of preparing this job for erection, from the estimating, through the shop operations, and including supervision of general field operations, was under the direction of Ed. T. Leslie. Mr. Leslie

(Continued on page 33)

Air Conditioning Applied to a Small Church

DURING the past year we have reported on these pages several very interesting heating installations designed and installed by B. F. Schwartz of Pittsburgh. It so happens that all these installations have been in houses. But house work is not the only type of job the Schwartz organization is prepared to do. They have found, for instance, that small churches and schools are also fertile fields for forced air sales effort.

A good example of the kind of church work Mr. Schwartz does is shown in the illustrations and drawings on these pages. These illustrations show details of the heating

plant which has served with marked success all during this past winter in the Church of the Atonement, Carnegie, Pa.

The exterior of the church is an 18-inch stone wall laid as a heavy load-bearing wall. This wall is lathed and plastered on the inside. The roof is steep pitched, of heavy slate, and has no flat ceiling on the interior.

One of the photographs shows that the floor is beam and slab concrete without any basement ceiling. The auditorium floor is hardwood laid on sleepers embedded in the concrete slab.

The data sheet shows most of the

heat loss coefficients used. For the exterior wall to the first floor level the coefficient .10 and for the wall above the basement .25. Both the ceiling and the floor were established as .10 for the nave, as this floor is on the ground, and the coefficient .20 for the rooms over the basement. A temperature rise of from 0 degrees to 70 degrees was used.

The system is an excellent example of air conditioning applied to a church. In the system the four fundamentals of air conditioning are fulfilled—air is heated, air is circulated, humidity is supplied and the air is cleaned. The system uses



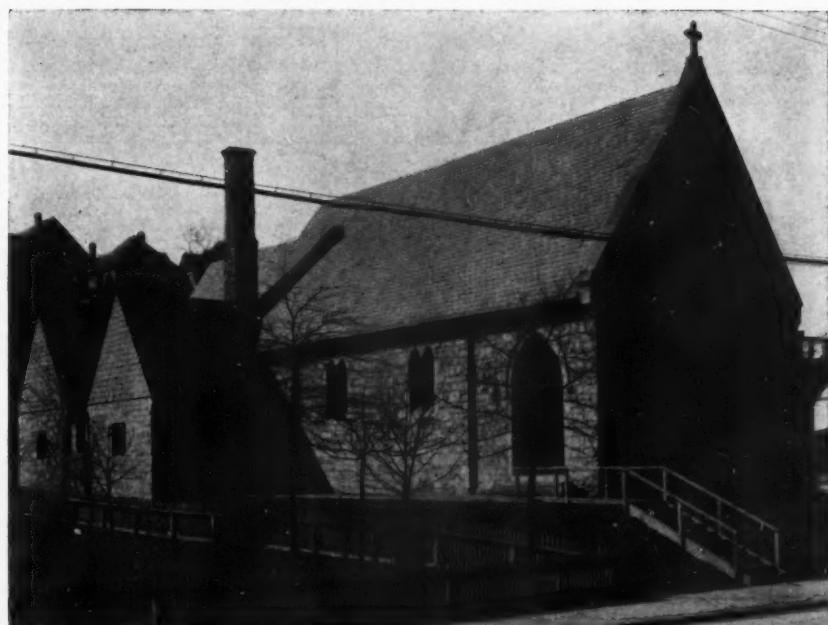
Here is the heater as it stands in one corner of a room used for social purposes. Quiet operation must be taken for granted in view of this use. Note the use of a high plenum chamber and horizontal trunks

a gas fired furnace, automatic humidifiers, air filters of the dry type, centrifugal blower and thermostatic control for both fuel and fan.

The system is built around a No. 5-LF-73 Bryant gas furnace, having an A. G. A. rated capacity of 176,000 B.t.u. per hour. Inasmuch as the total heat requirement for the various rooms is but 143,220 B.t.u., it will be seen that the heater has ample reserve capacity to take care of sub-zero weather.

The heater is equipped with the standard automatic humidifier which is part of the regular Bryant equipment, when so specified. This consists of individual pans placed on the sections making up the interior of the furnace, and which are connected to a valve and float arrangement at the side. The water level can be adjusted at will, in order to supply the proper degree of humidification in the church.

The centrifugal blower forming part of the equipment, has a capacity of 2,100 cubic feet per minute, against a static pressure resistance of $\frac{1}{8}$ in. of water. The system is furthermore arranged to permit for gravity operation in case of power failure or motor or blower trouble. Minneapolis-Honeywell equipment is used throughout. This consists: First, of a thermostat which is located in the rear end of



The exterior is stone with thick walls and small windows

the auditorium or nave. The gas is automatically turned on or off by this control. Inasmuch as the heater is located below the opposite end of the church from the thermostat location, ample heat is assured for every part of the building. The controls are so arranged that all the burners of the furnace go on full when the thermostat calls for heat and all burners shut off completely when the thermostat is satisfied. In addition, by-pass provision is incorporated to operate in case of electrical power failure.

The blower is controlled by a

type C-2 furnacestat located in the plenum or mixing chamber above the heater proper. This is shown in the view of the furnace room. The blower is not put into operation until the bonnet temperature reaches 140 deg. F. At this point the mercoid switch forming part of the furnacestat, makes contact and the blower starts. This continues as long as the bonnet temperature does not fall below 110 deg. At this point the blower is automatically shut off.

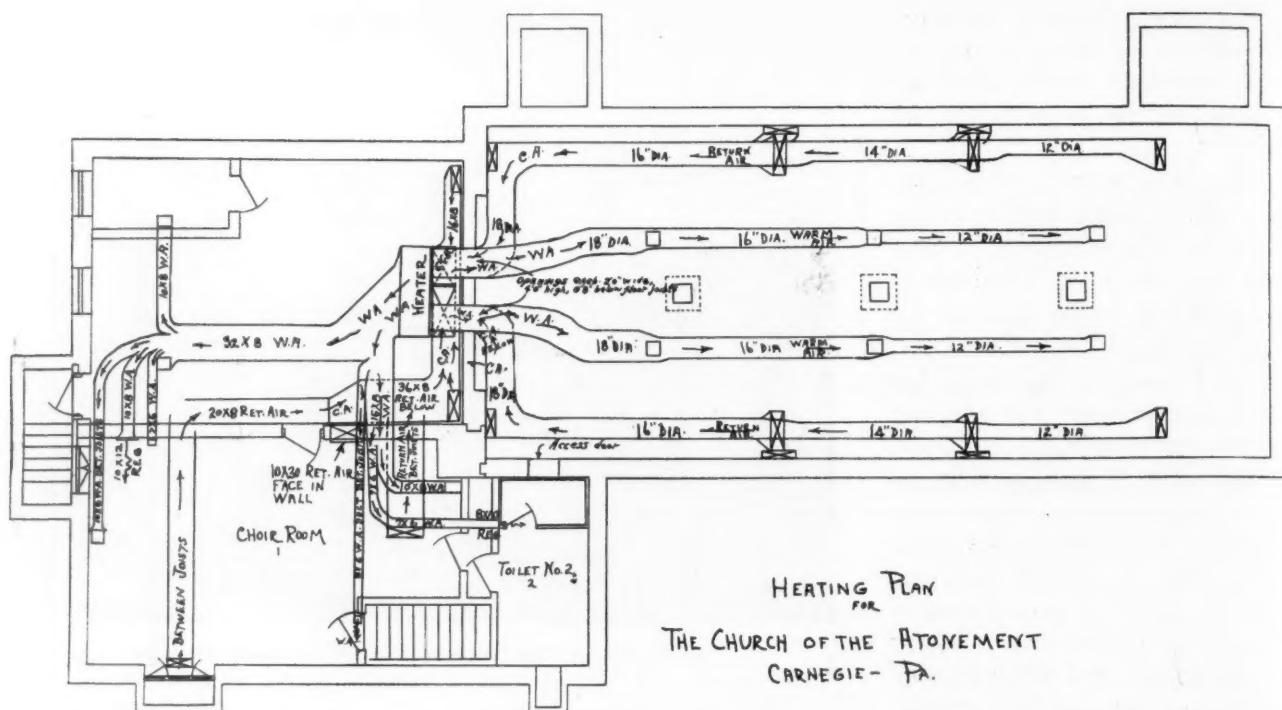
This arrangement assures a supply of warm air delivered at all times during the heating season, with no possibility for cool air to be blown in and create stratification. For summer use a separate switch is provided, which permits the blower to be turned on or off at will. In this way it will be possible to ventilate and circulate and perhaps lower the air temperature in the church a few degrees. This feature is particularly advantageous in public buildings of this type, and will help considerably in making the church more comfortable during the hot summer months.

The filters are three in number, and are made by the Reed Air Filter Company.

The original register specifications called for six 12x14-inch warm air registers for the nave.



The interior has a high ceiling in the nave. Stratification of the air and excessive heat loss were taken into consideration in figuring the heat requirements



Layout of the heating system. Warm air is supplied by three large trunks and several small ducts. Return air is taken from outside walls. All ducts are rectangular

This was later changed at the request of the architects, to an equal number of 9 by 18-inch registers. Four of these are shown in the aisle of the interior of the church. It will be seen that they are located at the sides of the pews and in this way do not interfere with the center walkway. The return air faces number eight for the church proper.

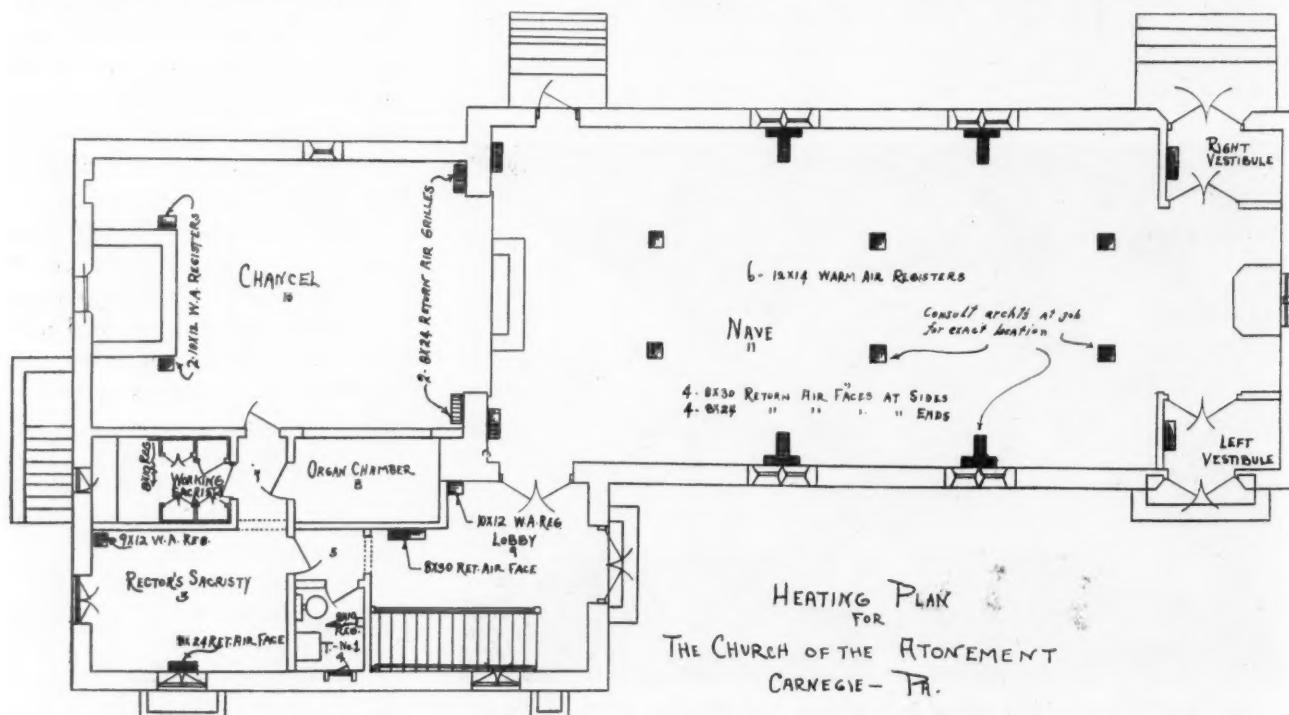
These are located on the outside walls.

The plan of heating the nave is floor introduction of heat from center positions with return air taken out of the outside walls. This plan circulates the warmed air up from the aisles, across the ceiling and down the side walls. In this particular room, there possibly will be

a warm strata of air inside the pitch of the ceiling with most of the circulation across the room below this strata.

Throughout the remainder of the rooms, warm air is introduced from floor registers and taken out through floor grilles.

The floor plan shows the location of all these registers and grilles.



The warm air registers are in the center of the nave and on inside walls in other rooms, while return air grilles are along outside walls

This plan also shows that provision has been made for picking up cold air introduced by the opening of outside doors and also catching window infiltration or falling sheets of cold air down the glass surface by placing the grilles under the windows along outside walls.

Attention should be called to the layout of the heating system in the basement. Because the furnace burns gas and is clean and noiseless in operation, it was not necessary to house the plant in a separate room, but to place it in one of the social rooms. This economized on space. The return air side of the heater collects cooled air from the nave and cold air from the main vestibule in two long trunks which follow down the outside walls. The rooms in the rear are served by two short stub ducts and one long trunk.

Enlargement of the trunk is progressive from each register back.

The warm side of the plant had to be spread out over considerable ground in order to reach all the rooms of the building. The nave, which probably required the most engineering thought, is supplied by two long trunks running down the center of the room. The rear rooms are fed through one large trunk running straight back from the heater and broken into branches at the end. Other registers are supplied from shorter trunks or by small individual runs. One such run is shown in the photograph of the heater.

Referring for a moment to this picture, note the use of a high plenum chamber from which all trunks and individual ducts are taken at right angles at the ceiling.

line. This plenum chamber is almost as high as the furnace casing. Engineers doing fan blast heating recommend the use of the plenum chamber for the reason that this large space permits all heated air to mix thoroughly and build up a positive pressure which tends to push out equally in every direction. This gives a positive and intensified pressure at the mouth of every trunk or duct.

Also note in the photograph of the heater the use of standing seam jointed ducts on all intermediate and large trunks and ducts, both warm and cold. Similar standing seams are also used vertically on the plenum chamber.

The architects for this handsome structure are Ingham and Boyd of Pittsburgh.

Copper Work on World's Fair Building

(Continued from page 29)

has had charge of some of the most important sheet metal contracts over the country during the last 30 years. His genius for organization is well shown by the shop operations such as the use of power equipment to fabricate great numbers of sheets daily. In addition a high order of field organization was required to

keep all this large amount of copper work going into position smoothly. On some days as much as two car-loads of copper were put into and through the shop and placed on the roof the next day.

Kitzelman Company has been in business for more than 25 years and has to its credit such outstanding

jobs in sheet metal as the Birmingham, Alabama, postoffice building and the General Motors plant in Saginaw, Michigan. Their activities in the ventilating field are exemplified in the 1500 Lake Shore Drive building, Chicago, where a most complete ventilating system was recently installed.

The 27th Annual Convention Nat'l Ass'n. Sheet Metal Contractors

THE twenty-seventh annual convention of the National Association of Sheet Metal Contractors, held May 12 to 15, inclusive, in Chicago, in spite of decreased attendance, was marked by the passage of several pieces of business of vital importance and by a program of addresses and entertainment seldom surpassed.

As to the business transacted, probably as important a piece of legislation as any was the vote to reduce the annual dues from the present \$12 per year back to \$5. Action on this motion was brought out on the floor as a result of the statement of the Wisconsin, New York and Kentucky delegations that memberships had fallen off alarmingly this past year as a result of contractor members being unable to pay the combined local, state and national association dues.

This legislation was not passed without considerable discussion. Several of the delegations stated that last year's dues of \$12 were being paid without complaint, but the general consensus of opinion was that because of business depression every effort should be made to maintain a high membership list even though such a drive meant a reduction in per capita income.

Another piece of business of great importance was the decision to hold the next meeting in January in Louisville, this meeting to be held at the same time and in conjunction with the National Slate Association and the United Roofers Association. It was emphasized that this joint meeting absolutely does not mean any movement to merge the three associations, but is for the purpose of ironing out some of the common problems and also to reduce the convention cost of

those contractors doing all three types of work and ordinarily attending all three conventions.

Other important business transacted was the voting of most of the resolutions recommended by the resolutions committee.

One of these resolutions dealt

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**OFFICERS TO SERVE UNTIL
JANUARY, 1932**

PRESIDENT

George I. Ray Charlotte, N. C.

FIRST VICE-PRESIDENT

H. Stanyer Dallas, Tex.

SECOND VICE-PRESIDENT

M. F. Liebermann Ambridge, Pa.

THIRD VICE-PRESIDENT

George C. Clark Chicago, Ill.

FOURTH VICE-PRESIDENT

Geo. F. Carraher St. Louis, Mo.

SECRETARY

W. C. Markle Pittsburgh, Pa.

TREASURER

Joseph C. Gardner Indianapolis

I. P. PRESIDENT

J. E. Merrick Louisville, Ky.

TRUSTEES

Term Expires 1931

George Harms Peoria, Ill.

Wm. E. Feiten Cleveland, O.

Harry Hartline Erie, Pa.

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with the widespread effort of general contractors to beat down the price of work—first by shopping around for lower prices, using some contractor's bid and plans as a basis for figures, and, second, by asking for lower bids after the bids are in. The convention voted to appoint a three-man committee to meet a similar committee of the American Institute of Architects to ascertain what can be done to remedy this situation.

This same committee was empowered to discuss with the A. I. A. committee the feasibility of the sheet metal contractor getting paid

for preliminary and estimate plans when the architect uses such plans for bids or as a part of his specifications for the project.

Wednesday Morning Program

The opening session was called to order by George H. Krutzkoff, chairman of the Chicago Convention Committee, who led the convention in singing "America" and introduced the speaker who was to deliver the address of welcome—O. W. Rosenthal, President, Builders Association of Chicago.

Mr. Rosenthal's address was one of the most stirring addresses even the old-timers could recall. As a part of this address Mr. Rosenthal briefly outlined his program to relieve unemployment in the construction industries and foster a more uniform, twelve-month building program. The gist of this program is a plan by which every person taking his livelihood from construction would subscribe to a national fund to the extent at least one \$50 share and as much more as his finances permit. This fund is to be administered so that anyone promoting a sound building project might use money from this fund for financing. Trust companies, bond houses and private individuals would all be eligible to draw on this fund. The committee in charge would, of course, so control expenditures that money would be available when money is hard to get or when a slack money or building market tends to curtail construction.

Mr. Rosenthal's plan proved new to most of the members present, but most delegates expressed an interest in the plan and agreed that something of this nature must be brought forward to iron out the present peaks and depressions in construction.

The response was given by National President George I. Ray.

Following the response, committees on Credentials, Auditing, Nominating and Resolutions were appointed by the president.

Wednesday Afternoon

No business sessions were scheduled for the afternoon, but all delegates were taken on a sight-seeing trip over the north side boulevards and parks and to the plant of the Revere Copper and Brass, Inc. Guides conducted groups through the plant and explained everything. Following the visit the busses brought the visitors back downtown and out to the Adler Planetarium on the lake front, where the delegates were introduced to the wonders of the universe as scaled down through the intricate equipment of the planetarium.

Wednesday Night

On Wednesday evening all the men were tendered a stag dinner and entertainment by the Chicago association in the Hamilton Club. Plenty of refreshments of all kinds and a splendid program of talented young ladies and good boxing bouts were given.

Thursday Morning Session

The second day's program was opened by President Ray calling on the committee in charge of the distribution of the association's book, "Standard Practice in Sheet Metal Work," for their report. The committee reported that out of the original 5,000 copies printed, 3,000 copies have been sold or given away. Quite a number of copies have been placed in the hands of leading architects either by local associations or by individuals. The National Association has also placed some books with architects.

The next report was that of the committee handling the co-operation with the Allied Construction Industries. This report was given by Albert J. Wagner, chairman of the committee. Mr. Wagner outlined the scope of this organization's activities for the benefit of members not familiar with the work.

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"There is need, today, for new ways of doing business. Old ideas must be scrapped to be replaced by a new order of thinking. Materials are changing, designs are changing, uses are changing. We must become salesmen in order to bring these changes to the public's attention. Business no longer comes to our door—we must go out and get it."

—Bennett Chapple.

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In brief, this organization has set up local organizations in cities over the country whereby the credit standing of contracting firms is reported to a central bureau. The standing of the firms delinquent in paying debts is listed. Thus a contractor who is indebted to some manufacturer or jobber and not paying is put on the debtor list and cannot buy more materials until his accounts are paid in full.

At the present time, Mr. Wagner reported, some 50 cities are now using this service and have set up local organizations. However, no uniform financing program has yet been perfected and some work will be necessary on this point. It was the recommendation of the committee that steps be taken to provide some central clearing house, such as in Washington, to which contractors in all parts of the country can send reports on the operations of general contractors. This clearing house might accomplish much in the way of eliminating the present evil of bid shopping among sub-contractors and use of sub-contractors' estimates and bids to beat down prices of other bidders.

Following the report of this committee, Bennett Chapple, Vice-President, American Rolling Mill Company, delivered an address, "Changing Tides." According to Mr. Chapple, business seems to have hit the bottom and should be

gin to swing upward slowly. To paraphrase the title of the address, the "tide is changing" and should begin to show improvement.

"There is need," stated Mr. Chapple, "for new ways to do business and for new ways of thinking. Business has graduated from the state of individualism and become a thing of large companies and even larger corporations. This has meant that many of the old ideas have had to be or will have to be scrapped.

"At the same time inventions have come forward to add their effect to progress, and the trend is from small and individually controlled and managed businesses to huge organizations in which machinery is the dominating factor of all activities.

"In our own business the manufacture of sheets has changed from the slow, hand-made operation of twenty years ago to the continuous mill by which miles of sheets are turned out daily.

"Materials are also changing and new ways of using old materials are continuously being brought out. Just a few years ago sheets were much restricted as to market. Today sheets are going into all sorts of uses such as furniture, automobile bodies, radios, etc. And at the same time this tremendous possible production of sheets has made it necessary for the mill, the jobber and the contractor to be continually on the watch for new places to sell sheets.

"Witness," said Mr. Chapple, "such innovations as the use of sheets as metal bases for paved roads, as colored blackboards in schools, as cribbing for retaining walls, for complete knocked-down houses, and a hundred other uses undreamed of a few years ago. All this progress is due to the huge reservoir of sheets ever ready to break through convention which dams up their flow.

"The time is here when every contractor must be a salesman. Business no longer comes in the door, but must be gone after. As an example, I recently had some

radio trouble and called in a service man. He said it would cost some \$37.00 to fix the radio up, but it never occurred to him to suggest that I had better buy a new radio. As a matter of fact, I had to sell myself a new radio. Such selling will do more to kill business progress than anything else."

Overhead Expense

The report of the Overhead Expense committee was given by M. F. Liebermann. Mr. Liebermann waived a blackboard discussion of the figures read as he stated that a similar discussion would be given later in a paper to be presented by C. F. Warning of Oshkosh, Wisconsin.

Mr. Liebermann stated that 25 questionnaires were mailed out since the last meeting, but that only four returns had been received. This small return, said Mr. Liebermann, did not warrant drawing any definite conclusions. One thing was apparent, the speaker said, and that is that members seem to feel that overhead is a personal proposition and that reports are not especially favored.

It was suggested by the committee that in view of this seeming hesitancy, future overhead reports be gathered by local and state associations and that the national association stop trying to gather data.

From the four reports the following was deduced. Overhead on productive labor averaged 104.6 per cent. Overhead on gross business averaged 37.7 per cent. The reports showed that bad debts on gross business averaged .6 per cent. Lost time on productive labor averaged 2.6 per cent. In the field of wages, the average wages on productive labor averaged 47.4 per cent and on gross business 16.5 per cent.

National Councillor Report

John A. Pierpont, who for several years has acted as national councillor to the Chamber of Commerce of the U. S. A., reported that at the round table meeting held in Atlantic City a note of optimism

was evident and that business leaders seemed to feel that some progress toward better conditions has been made. Secretary of Commerce Lamont, who addressed the meeting in Atlantic City, reported some progress toward better business and pointed out that business seems to have reached a period of

ers wishing to read this talk refer back to the February 16 issue.

January Meeting

The committee on Related National Associations reported on the joint meeting to be held next January in Louisville in connection with the National Slate and United Roofers' associations. It was emphasized that absolutely no effort was to be made to merge the three associations, but that the idea was to eliminate expense and time involved in trying to attend all three conventions. Some discussion was had on the things to be discussed at this meeting. It was stated that January had been selected since that time in the winter seemed to offer more opportunity for contractors to get away from business.

Following this, E. B. Langenberg reported briefly on the progress made by the Committee of Ten. Progressive reports on the activities of this organization have been reported from time to time in *AMERICAN ARTISAN* and readers who have followed these reports are no doubt familiar with the work underway.

R. S. Schmeider Address

An address, "The Silver Lining" was delivered by R. S. Schmeider, Manager, Specialties Division, Milcor Steel Company. Using a new introduction, Mr. Schmeider used the charts and figures from his address delivered at the convention of the Indiana Sheet Metal and Warm Air Heating Contractors, Ft. Wayne. This address was reported in full in the March 16 issue of *AMERICAN ARTISAN* and readers wishing to read this can refer to that issue.

It was the opinion of the audience that this address contained an idea which every sheet metal contractor might well take to heart. That idea is that no sheet metal job should be bid in without the contractor making a list of the construction materials which might better be changed into metal. As reported in the address, the job used as an example showed an increase from a possible bid price of

HIGHLIGHTS OF THE CONVENTION

Reduction of annual dues from \$12 to \$5.

Decision to hold the next meeting in January, 1932, jointly with the National Slate Association and the United Roofers' Association.

Appointment of a committee to meet with A. I. A. to iron out troubles over bid shopping and price hammering.

Decision to have present officers remain in office until the January meeting in Louisville.

stability, although below average good business.

This report was followed by the report of the Board of Directors whose principal recommendation was the reduction in per capita tax discussed earlier in this report.

C. F. Warning Address

Following the discussion on per capita tax, C. F. Warning delivered his address on "Overhead as Applied to My Business." This address was the same one that Mr. Warning delivered at the meeting of the Wisconsin state convention and was reported in full in the February 16 issue of *AMERICAN ARTISAN*, page 30.

This address was accompanied by a chart discussion showing the same figures as illustrated in our report of the address previously. The address contains much of interest and it is suggested that read-

\$35.00 to a possible bid price of \$707.50 or an increase of 2,000 per cent.

Friday Session

The first report on the Friday morning program was read by E. H. Riesmeyer, chairman, Warm Air Furnace committee. Briefly, the report said that the greatest advances made in warm air heating during the past year or two have been made in the field of air conditioning. Another important development has been the rapid expansion of gas as a fuel for heating. The use of these two developments, coupled with the growing use of oil and coal stokers, has made the home-owning public heating conscious.

As a result, contractors are now being asked to figure on installations where automatic heating with forced air and complete control are used. This has brought about the introduction of the trunk line or rectangular duct system, use of high bonnets or plenum chambers, color application to the heating plant and the use of basement space for recreation spaces with the heater placed out of the way in a corner.

There is great need today for engineering service or engineering information. There are too many contractors trying to do this class of work without having any knowledge whatsoever about the technicalities involved in engineered heating systems.

One thing badly needed is co-operation all along the line—between manufacturer and jobber, jobber and dealer, dealer and manufacturer, and of all three with the consumer. Too much sloppy work is still in evidence and the abolishment of asbestos paper would be a boon to the industry in that it would compel a better grade of workmanship.

The heating man must learn to talk quality and service and forget to talk price.

Following Mr. Riesmeyer's report the resolutions committee reported through J. E. Merrick. The resolutions were told about at

the beginning of this report. In addition, votes of thanks were tendered the hotel management, the Chicago association for their splendid entertainment and management, the trade papers for their co-operation all through the year and for the vast fund of information which they are making available monthly. In addition, it was recommended that a committee be appointed and empowered to co-operate with O. W. Rosenthal in furthering the work of his project.

Labor Committee Report

George Thesmacher, chairman of the Labor Committee, outlined quickly the work accomplished during the past year. The principal item was the co-operative work with Board of Claims in settling disputes between crafts as to who should do certain classes of work. The work on the Empire State Bank, New York City, was cited as on this job all the thousands of pounds of metal work was installed and fabricated by ornamental iron workers and shops. The committee reported that considerable progress toward a solution of this trouble had been made.

The concluding address of the convention was given by Jack

Stowell, Aurora, Illinois, Special Representative of the Better Business Bureau, National Warm Air Heating Association. His subject was, "You've Gotta Ask 'Em To Buy." Because of a last minute conflict in the program Jack's time was very much reduced and he had to speak to a small audience. Nevertheless, his talk, while consuming but a few minutes, contained one major point, that is—if the sheet metal contractor expects to have or get any business these days he has to go out and get it.

"There is need," Jack also stated, "for the industry to begin to think in terms of the consumer. It is no longer possible for the contractor to think of himself, but he must think in terms of what he has to offer that the consumer might be interested in. More and more the contractor must merchandise just as the merchant does. He must become a salesman for his services. If he does, he will make some money. If he refuses to sell, he might just as well close up shop. And the smaller the shop the greater the need for salesmanship."

The concluding feature of the convention was a trip over the south side boulevards and through the Dries and Krump Co. plant.

Ladies Program Filled With Enjoyable Entertainment

WHEN Elmer Olson, chairman of the entertainment committee for the National Sheet Metal Convention, promised to take care of the ladies, he certainly meant it, and those who were lucky enough to take in all the entertainment will remember the Chicago convention for a good long time.

The Chicago Ladies' auxiliary co-operated to a member. Mrs. Albert Wagner, chairman, and her willing corps were on hand to take care of visiting ladies and until the last out of town guest had departed, members of the

committee stayed at the Congress Hotel.

Tuesday afternoon, the ladies went on personally escorted trips around the loop, and Tuesday evening, all joined in the celebration of the "Illinois Night" party put on by the Travelers' Auxiliary. The Chicago ladies had asked the Travelers to take care of the out of town guests first, but fortunately there were enough good dancers on hand so that there were no wall flowers.

Wednesday was the Big Day, starting with a two hours' trip by bus through Chicago's boulevards

and parks, winding up with a party that will be long remembered at the South Side Swedish Club. Dinner was served in "Smorgasbord" style, calories forgotten and the evening spent playing bridge and other card games. Each and every lady was given a beautiful favor. The door prizes were real prizes, as well as the table prizes—and the nicest part of all was the Chicago Auxiliary members refused to accept prizes.

Mrs. George Krutskoff created quite a sensation when she joined the professional entertainers and did her little stunt.

Thursday afternoon a personally conducted tour through Marshall Field and Company's retail store was followed by a style show and afternoon tea, and then came the banquet in the Gold Room, followed by dancing in the Florentine Ball Room of

the Congress. Friday was taken up with trips through the Shedd Aquarium and the Adler Planetarium.

The business sessions were well attended and reports of various committees showed that the ladies are serious in their desire to do their share. Of the fifteen books purchased, ten have been distributed to various worthy institutions and the balance will be taken care of shortly.

Officers elected to serve until next meeting are:

President—Miss Mary O'Leary, Louisville, Ky.

First Vice-President—Mrs. Fred Baehr, Baltimore, Md.

Second Vice-President—Mrs. Ben Kolbenschlag, St. Louis.

Third Vice-President—Miss Mildred Markle, Pittsburgh.

Secretary—Miss Dorothy Harpring, Louisville.

Treasurer—Miss Irene Fingles, Baltimore.

A. C. McKinley Heads III. Travelers Auxiliary

TRUE to tradition, the Illinois Travelers' party, on Tuesday evening, May 12, in the Florentine Room of the Congress Hotel—Illinois Night—was one round of fun from the moment that Lew Diamond's snappy orchestra sounded its first note until the last wail of the saxophones died on the air.

"No Wall Flowers" was the slogan of the committee in charge, and as the charming Louisville belles said next day, "We're all in, but it shuh was wuth it."

Several short business sessions were held during the week, and all agreed that Fred Gottschalk's year as president had been one of progress. Members are paying their dues, new ones joining the association, and the treasury shows a healthy balance.

The main purpose of the Illinois Travelers' Auxiliary is to bring manufacturers and supply houses and their salesmen in closer per-

sonal contact with the sheet metal contractors of Illinois, as well as provide entertainment for the annual convention.

Membership is limited to manufacturers, jobbers, supply houses (and their salesmen) who sell to the sheet metal, roofing, warm air heating and kindred trades in Illinois, either by mail or through salesmen.

The Annual Roster will be in the form of an attractive wall calendar.

Officers elected for the year 1931-1932 are:

President—A. C. McKinley, Peoria.

Vice-President—Frank W. Dilger, Chicago.

Secretary—Etta Cohn, Chicago.

Treasurer—Jack Sauer, Peoria.

Sergeants-at-Arms—Herb. Symonds and Jules Gerock.

Directors—Mat. H. Friedman, Chicago (chairman of Advisory Board); F. S. Gottschalk (ex-officio), Park Ridge; D. C. Ellison, Chicago; H. R. Harrison, Chicago; W. R. Weil, Chicago.

Western Hot Air Club Blows Itself

ON May 11th, nineteen of the leading Hot-Air merchants of the Warm Air Heating Industry gathered in the Old English room of the Congress Hotel to hold their Annual Meeting and to discuss the problems which do *not* face the Warm Air Heating Industry.

All officers were present with the exception of Earl Nesbit, Sergeant-at-Arms. The meeting was called to order by President Herb Symonds. The first, second, third and fourth vice-president, George Harms, assisted by the Secretary-Treasurer, John Fehlig, reported on financial conditions of the body.

Due to the absence of Earl Nesbit, the office of Assistant Sergeant-at-Arms was created, and by an overwhelming majority, Blair Quick was elected to this newly created office.

Those attending, who did not have titles, but desired to create them, were: Ralph Blanchard, Bob Badeau, Ed Carter, Jack Johnson, Mat H. Friedman, Ros Mahoney, George Auer, Fred Gottschalk, Howard Mason, Ned Cummings, Etta Cohn, Ed Scott, Fred Bishop, and Sam Burgess.

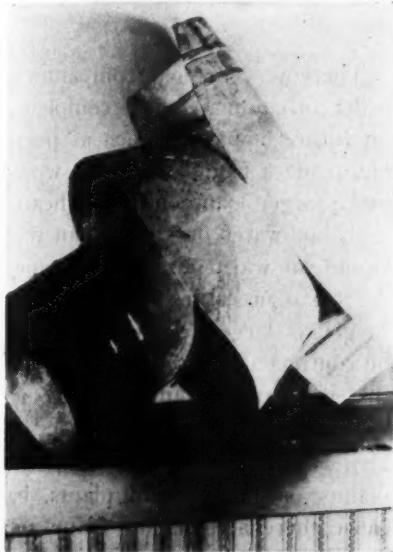
The report of the Chairman of the Entertainment Committee showed how months had been spent in planning for the entertainment.

One serious moment was set aside during this meeting to pay tribute to Fred Nesbit, who passed away recently. To those attending, Fred Nesbit was a friend and a helper. The entire industry feels his passing as a great loss, and no better mark of tribute to a friend could have been shown than that shown at the meeting of the Western Hot-Air Club.

As the duties of officers are not important the same officers were re-elected and the next meeting will be held with the next national S. M. C. Convention.

A Pattern for a One-Piece Chimney Cap

By M. P. BLIM



Looking up into the wind cap

TO lay out the pattern, draw center lines of an indefinite length at right angles to each other, as indicated by lines marked P-P and g-g.

From the center each way, mark off the following spaces a, b, c, etc.

These measurements are as follows:

Make a equal to dia. of pipe.

Make b three-fourths the dia. of pipe.

Make c the dia. of pipe.

Through these points draw lines at right angles to center line indefinitely.

Make d equal to one-half circumference of pipe and connect by drawing horizontal lines from f to f .

The space marked (e) is one-third diameter of pipe and (g) one-half diameter.

With o and o as centers, scribe arcs from 1 and 2 indefinitely.

Bisect h-i and through point j draw lines from o, completing flaring part.

Allow laps as shown and mark out rivet holes and punch before forming.

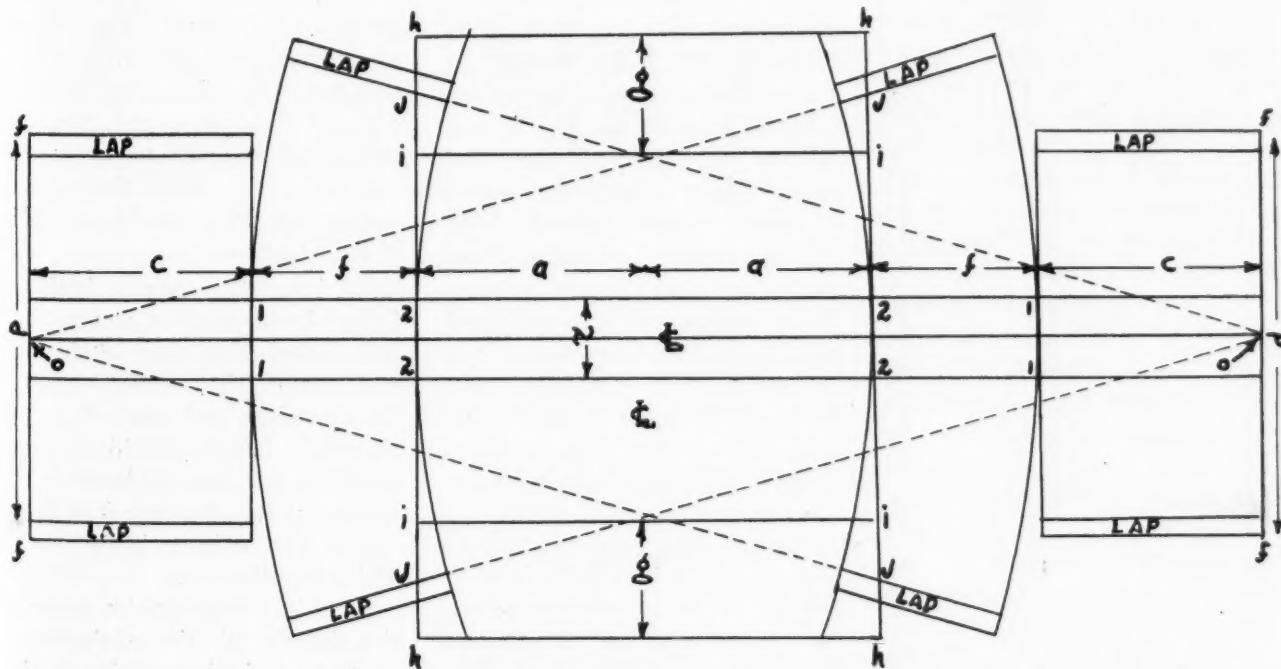
When cutting out pattern cut to



The finished cap

points 1 and 2, as this material must be left solid so as to hold top together.

In practice the best method is to rivet the seams. Forming the flaring part and riveting first. Then the round part later.



Here is the one-piece cap as laid out on paper ready to transfer to metal. Note that provision has been made for the laps required to seam and solder the cap

One Method for Designing Forced Air Installations

By FRED R. BISHOP*

FTER the December meeting, I heard remarks from some who attended, especially dealers, to the effect that they heard a great deal about why they should get into the forced air field, and what the blower manufacturers should do to educate the dealers, but, that no one told them any concrete method of going about it, nor gave them any ideas on how to design a blower job.

With these comments in mind your association officers have tried to forestall any such unfavorable comments as a result of the present meeting.

Accordingly, they divided the forced air program among five speakers; the first, Mr. Miles, to acquaint you with the fruitful field ahead, and how to secure some of this business; the second, Mr. Olson, to tell you how he has already succeeded in following out some of these ideas, and to prove that the field is already here; the third, Mr. Daniels, to tell you of the success in forced air heating with the use of furnaces designed especially for gas or oil as fuel; the fourth, Mr. Day, to tell you about the demand which has already developed among the well-to-do for forced air heating, ventilating, air conditioning and cooling; and the fifth, myself, to give you a few ideas to assist you in designing these installations, and to warn you of a few of the pitfalls to guard against.

If from this meeting, you will have learned anything of value, we will feel that both your time and our's have been well spent.

In a recent call on a furnace

manufacturer, he wondered whether for the good of the furnace manufacturer it is well for the dealers to be spending so much time on blower jobs, because he thought it resulted in fewer number of furnaces sold—to the detriment of the manufacturer.

At first thought, it might appear that this furnace manufacturer is right in his reasoning but I have an entirely different thought to present on what is the matter with the furnace business at the present time aside from the loss due to the depression of the past year and a half.

The quantity business as a general thing which the furnace manufacturer enjoyed for several years after the war, was secured by the dealers from builders who erected houses by the dozen. The average builder of quantity homes was after all he could get from selling a house and getting out from under. He did not care what kind of a job he got so long as it had a furnace.

Unscrupulous furnace dealers complied with the builders' wishes in order to get the price down, and many furnace manufacturers were so intent on getting quantity business that they did not bother about the kind of plants dealers installed. Cheap, undersized, piece work, unsatisfactory jobs were installed, and everybody got a black eye. The banks and insurance companies who made the loans received complaints from the buyers of these homes. The builder "passed the buck" to the furnace contractor, and the furnace contractor back to the builder, and nobody got anywhere excepting the furnace man and the furnace manufacturer, and they got DOWN AND OUT.

Thereupon, the loan companies in order to eliminate these complaints on future homes as much as possible, made a ruling that they would make larger loans on homes heated with hot water or steam than they would on warm air heated homes. As it was necessary for the builder to get as large a loan as possible, he contracted for radiator heat and that is where it stands today.

Don't think, though, that the loan companies are not getting complaints on these steam plants, because there are just as many rotten steam plants installed in these homes proportionately as there ever were warm air plants, but the loan companies are not yet sure just what is wrong. However, there is going to be a day of reckoning, and, when this day comes, what are they going to do about it? (With apologies to Buck Taylor.)

By that time, blower jobs will have secured a foothold in the privately owned homes. The feeling of satisfaction on the part of these owners will be reflected to the bankers and financiers, and the big swing will be back to warm air standard code jobs in the smaller homes, and forced air blower jobs in the larger ones.

To bring the furnace business back to healthy volume, you see that it is necessary to start at the top with blower jobs in order to reach the financiers, and work down to the smaller homes. The higher class work a dealer does, the better is his reputation and the more it will result in the ordinary house owner giving him his work.

So, I conclude without reservation that the salvation of the warm air furnace business today is the blower job. The more satisfactory

*The Brundage Company, Kalamazoo, Mich. Talk delivered at the National Warm Air Heating Association convention, Columbus, Ohio.

the blower jobs that will be installed in the next couple of years, the sooner warm air heating will be back to its own. On the other hand, if many dealers take hold of the blower end, buy cheap equipment, install it without scientific knowledge, then the whole warm air fraternity is sunk.

The blower and air conditioning business to grow and prosper must be the result of education to the dealers, and from dealers to the owners. The furnace manufacturers and jobbers must learn the principles of blower systems and design, and this must be transmitted to the dealer.

Many manufacturers and jobbers realize this. That is why so many of you including dealers are here today. Last evening in the hotel lobby, I overheard two dealers talking. One said to the other: "Are you going home tonight?" The other said: "No, sir. I came down here to hear about this forced air business, and I am going to stay over until morning and get the rest of it."

It is up to the dealer to get familiar with blower design, blower selection, and forced air design, and go after the jobs that will pay him a profit, and in this way bring back the furnace business to where it belongs.

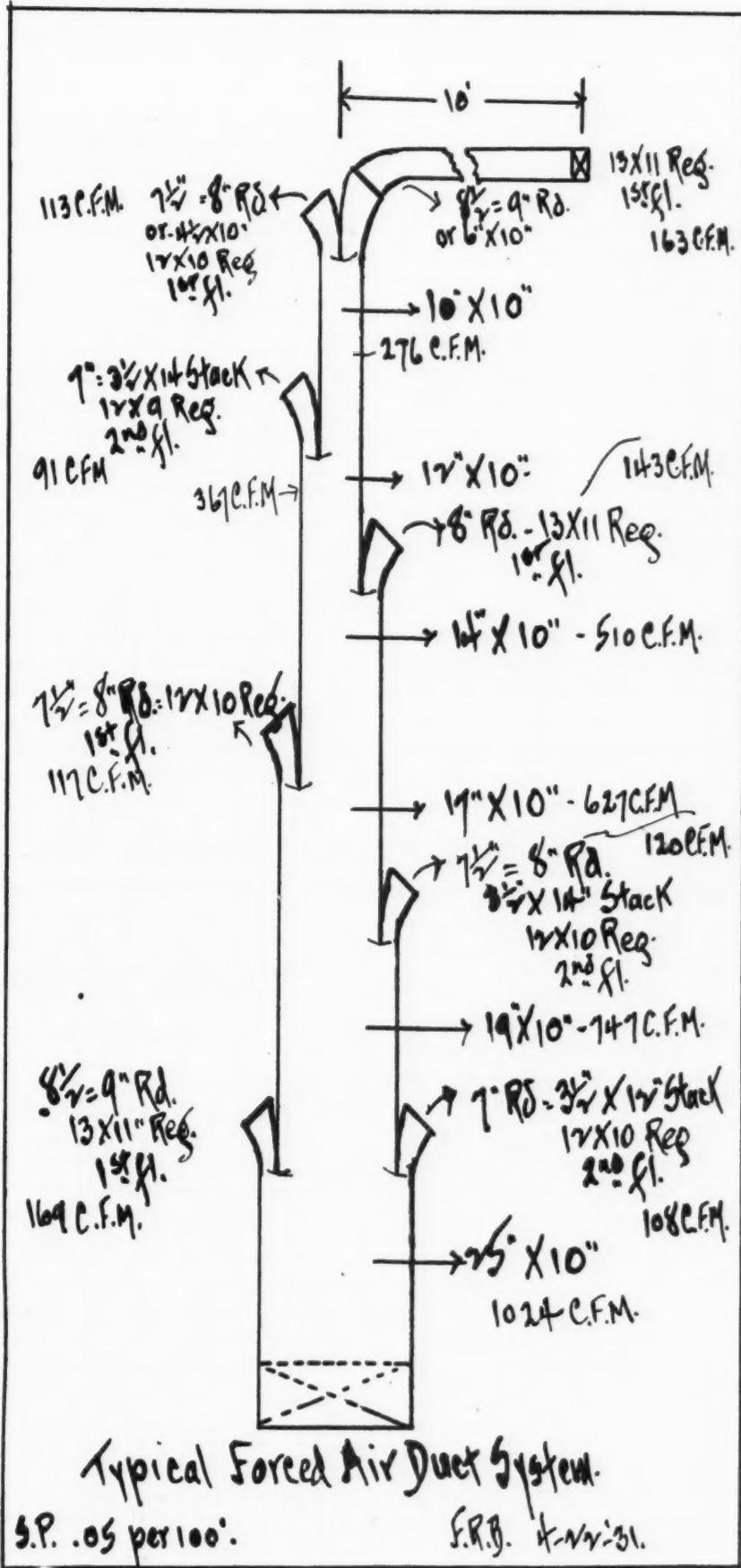
Now, we are right where we left off at the December meeting.

How are you going to design a blower job?

How are you going to select your blower?

As to blower job design, there are several ways of going about it depending on how much you know to begin with. When it comes to mathematics, you can't start a child on algebra and trigonometry until he has first mastered the more simple arithmetic problems.

At the Michigan Sheet Metal Convention, in Saginaw in March, I presented an easy way for beginners by using the Standard Code as a base, and for pipe sizes, instead of multiplying by 9 or 6, to use a multiplier of 5, and maintain this in all leader pipes, and hold the



This is a simple duct system such as might be used in a garage, factory or office. The velocities, sizes and c.f.m. are indicated. How these factors are established is related fully in the text.

stacks to the second floor the same size as basement leaders. This results in a velocity of about 380 feet per minute. This particular multiplier was used because it results in stacks that can be run through ordinary partitions, and the velocity is about right for a blower job with the proper blower.

When a job is laid out on this basis, it is advisable to cut the main duct sizes about 20 per cent excepting toward the ends of the mains to somewhere near equalize frictions in all parts of the lines. There is more friction, with the same speed, in smaller pipes than there is in larger pipes, and this is the reason for cutting the size of the main ducts to get a higher speed for the same friction in a smaller pipe at lower speed.

For blower size in this way of figuring, multiply the leader pipe area for every register by 2.6, which is the same as dividing the leader pipe area by 144 to change it to square feet, and then multiply

by 380 velocity to get total cubic feet per minute.

Full report of this talk was published in March 20 issue of *Furnaces and Sheet Metals*, and also March 31 issue of *AMERICAN ARTISAN*. To any one who feels that what follows today is just a little over his head until he gives it more study, I say that he will not go far off using this method after he has equalized all leader pipe dampers.

Let me say right here that a plant laid out on a strictly gravity basis with part on first floor and part on second will not make an evenly heated blower job. More air will be delivered proportionately on the first floor than on the second because a 9-inch pipe on the first floor has an area throughout of 63 inches. This same pipe terminating in a wall stack on a gravity job would have an area in the stack of only 44 inches at the most. Blower jobs deliver air in proportion to the area of the smallest part of the run as against the velocity in the run.

So, you see, more air will be delivered down stairs than up, and, consequently, downstairs will be warmer than up.

When a blower is installed on a gravity job, the first floor pipes must be dampered back to the areas of the wall stacks to the same size pipes on the second floor.

To those who have made a study of B.t.u.'s, I recommend the B.t.u. method, which is the approved method of figuring all heating calculations, and is the basis of the Standard Code factors throughout.

Many dealers shy when B.t.u.'s are mentioned. This shyness is apparent through unfamiliarity with B.t.u. methods. Such dealers today are like horses used to be some years ago when automobiles first appeared on the roads. They shied and were scared and excited. Soon, they found that the auto would not harm them, and now a horse is perfectly at ease side of a car. So it will be with dealers after they get

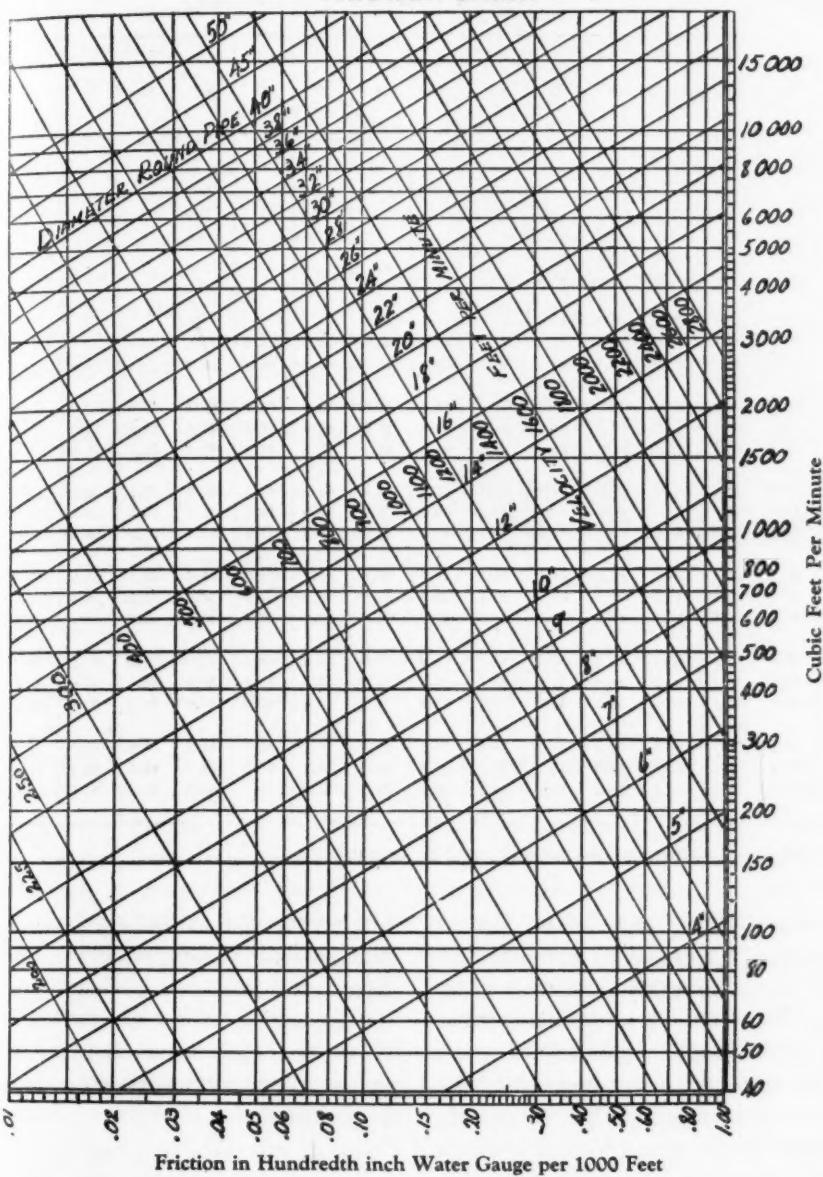
Circular Equivalents of Rectangular Ducts for Equal Friction

Figures at top and sides are rectangular duct dimensions. Figures in body are round pipe equivalents

SIDE RECTANGULAR DUCT	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
8	6.9	7.6	8.2	8.8																
9	7.3	9.0	8.7	9.3	9.9															
10	7.7	8.4	9.2	9.8	10.4	11.0														
11	8.0	8.8	9.6	10.2	10.9	11.5	12.1													
12	8.3	9.2	10.0	10.7	11.4	12.0	12.6	13.2												
13	8.7	9.6	10.4	11.1	11.8	12.5	13.1	13.7	14.3											
14	8.9	9.9	10.8	11.5	12.3	12.9	13.6	14.3	14.9	15.4										
15	9.2	10.2	11.1	11.9	12.7	13.4	14.1	14.7	15.3	16.0	16.5									
16	9.5	10.5	11.4	12.3	13.1	13.8	14.5	15.2	15.8	16.5	17.1	17.6								
17	9.8	10.8	11.8	12.6	13.5	14.2	15.0	15.7	16.3	17.0	17.6	18.2	18.7							
18	10.0	11.1	12.1	13.0	13.8	14.6	15.4	16.1	16.8	17.4	18.1	18.7	19.2	19.8						
19	10.3	11.4	12.4	13.3	14.2	15.0	15.8	16.5	17.2	17.9	18.6	19.2	19.8	20.4	20.9					
20	10.5	11.6	12.7	13.6	14.5	15.4	16.2	17.0	17.6	18.4	19.0	19.7	20.3	20.9	21.5	22.0				
22	11.0	12.1	13.2	14.2	15.2	16.1	16.9	17.8	18.5	19.2	19.9	20.6	21.3	21.9	22.5	23.1	23.6	24.2		
24	11.4	12.6	13.8	14.8	15.8	16.8	17.6	18.5	19.3	20.0	20.8	21.5	22.2	22.8	23.5	24.0	24.7	25.2	25.9	26.4
26	11.8	13.1	14.3	15.4	16.4	17.3	18.3	19.2	20.0	20.8	21.6	22.3	23.0	23.8	24.4	25.1	25.7	26.3	26.9	27.5
28	12.2	13.5	14.8	15.9	17.0	18.0	19.0	19.8	20.7	21.5	22.4	23.1	23.9	24.6	25.3	26.0	26.6	27.3	27.9	28.5
30	12.6	13.9	15.2	16.4	17.5	18.5	19.5	20.5	21.4	22.2	23.1	23.9	24.7	25.4	26.2	26.8	27.5	28.2	28.8	29.5
32	12.9	14.3	15.6	16.9	18.0	19.1	20.1	21.1	22.0	22.9	23.8	24.6	25.4	26.2	27.0	27.7	28.4	29.1	29.8	30.5
34	13.2	14.7	16.1	17.3	18.5	19.6	20.7	21.6	22.6	23.5	24.4	25.3	26.2	26.9	27.7	28.5	29.2	30.0	30.7	31.3
36	13.6	15.1	16.4	17.7	19.0	20.1	21.2	22.2	23.2	24.2	25.1	26.0	26.8	27.7	28.5	29.3	30.0	30.8	31.5	32.2
38	13.9	15.4	16.8	18.2	19.4	20.6	21.7	22.8	23.8	24.8	25.8	26.7	27.5	28.4	29.2	30.0	30.8	31.5	32.3	33.1
40	14.3	15.7	17.2	18.6	19.8	21.1	22.2	23.3	24.4	25.4	26.4	27.3	28.2	29.1	29.9	30.8	31.6	32.4	33.1	33.9
42	14.5	16.1	17.6	19.0	20.3	21.6	22.7	23.8	24.9	25.9	26.9	27.9	28.8	29.8	30.7	31.4	32.2	33.0	33.8	34.5
44	14.8	16.4	18.0	19.4	20.7	22.0	23.1	24.3	25.4	26.5	27.5	28.5	29.5	30.3	31.2	32.1	32.9	33.7	34.6	35.3
46	15.1	16.7	18.4	19.8	21.1	22.4	23.6	24.8	25.9	27.0	28.1	29.1	30.1	31.0	31.9	32.8	33.8	34.6	35.4	36.2
48	15.4	17.0	18.7	20.1	21.5	22.8	24.1	25.2	26.4	27.5	28.6	29.6	30.5	31.6	32.5	33.4	34.3	35.2	36.1	37.0
50	15.7	17.3	19.0	20.4	21.9	23.2	24.5	25.7	26.9	28.0	29.2	30.3	31.3	32.2	33.1	34.1	35.0	35.9	36.8	37.6
52	15.9	17.6	19.2	20.8	22.2	23.6	24.9	26.2	27.4	28.5	29.6	30.7	31.8	32.9	33.8	34.7	35.6	36.5	37.4	38.3
54	16.1	17.9	19.6	21.1	22.6	24.0	25.3	26.6	27.8	29.0	30.1	31.2	32.3	33.4	34.4	35.3	36.3	37.2	38.0	38.9
56	16.3	18.2	19.9	21.5	22.9	24.4	25.7	27.0	28.3	29.5	30.6	31.7	32.8	33.9	34.9	35.9	36.9	37.8	38.7	39.6
58	16.6	18.4	20.2	21.8	23.3	24.7	26.1	27.4	28.7	30.0	31.1	32.2	33.3	34.4	35.4	36.4	37.4	38.4	39.4	40.3
60	16.8	18.7	20.4	22.1	23.6	25.1	26.5	27.8	29.1	30.5	31.6	32.7	33.8	34.9	36.1	37.1	38.1	39.1	40.0	40.9
62	17.0	19.0	20.7	22.4	24.0	25.5	26.9	28.2	29.5	30.9	32.1	33.2	34.3	35.4	36.6	37.7	38.7	39.6	40.6	41.6
64	17.3	19.2	21.0	22.7	24.3	25.9	27.3	28.6	29.9	31.3	32.6	33.7	34.8	35.9	37.1	38.2	39.2	40.2	41.2	42.2
66	17.5	19.5	21.2	23.0	24.6	26.2	27.7	29.0	30.3	31.7	33.0	34.2	35.3	36.4	37.6	38.7	39.8	40.8	41.8	42.8

First section of a chart on which is plotted the equivalents for round and rectangular ducts for equal friction.

FRICITION CHART



This chart is used to plot the c.f.m. against the frictional resistance of a duct for different sizes of pipe.

into the habit of figuring B.t.u. methods.

The first thing to arrive at in figuring a blower job is the heat loss. This is exactly what is done in the standard code. When you divide the cubic contents by 800, the glass by 12, and so on down the line, and add them together, you have the B.t.u.'s in thousands. If it is easier for you to continue with this method, after you have added these results together, add three zeros at the end of these figures and you have the heat loss in B.t.u.'s.

After you have the B.t.u.'s for each room, the next thing to do is

to arrive at the cubic feet per minute to be delivered to each room to offset this heat loss.

Before you can get the c.f.m. required, it is first necessary to decide on the temperature you want the air to enter the room as against the temperature of the air leaving the room. The difference is left in the room and does the heating.

It is customary to use an inlet temperature of from 120 to 135 or 140 degrees. I do not recommend too low an inlet temperature at the present time because the public is not yet accustomed to the low air temperatures, and is apt to think the plant is not doing its duty if the

air at the register is not rather warm. Further than this, the lower the air temperature entering the room, the more air is necessary to accomplish results. So, for extreme weather, I believe it is best to have the air enter the rooms at about 135 degrees in a residence, and, in mild weather, it can be adjusted with the bonnet switch to about 120 degrees.

If you are heating to 70 degrees, you can assume that the air will leave the rooms at 65 degrees. This leaves a difference between 135 and 65 or 70 degrees. On this basis, to arrive at c.f.m., multiply the B.t.u. heat loss by 55 and divide this by 70, and then by 60, and you have c.f.m. This formula simplified resolves itself into multiplying B.t.u.'s by the decimal .013.

If you want to assume an entering temperatures of 130 degrees against an outlet of 65 degrees, multiply by .012.

Any temperature difference can be used when occasion requires, and the multiplier arrived at by using the above formula.

After each room has been figured on the above basis, add the c.f.m. for each room, and you have the total c.f.m. for the job.

Now you come to pipe sizes. Pipes should all be sized so that there is the same friction per foot of length throughout the entire job.

Let's refer to the sketch. The run on the right hand end of the main is a good one on which to base friction for all other runs. This has a B.t.u. loss of 12,543. Multiplying this by .013, we have 163 c.f.m.

Now we come to the use of the friction chart. For best practice on this job, we will assume a velocity of 400 f.p.m. in branches. Refer to right-hand side of chart and we find 160 c.f.m., which is close enough. From this, follow a horizontal line to the left until you come to the diagonal line running from the upper left corner marked 400 velocity. At the intersection of 400 velocity and 160 c.f.m., follow a line diagonally toward the upper right

Circular Equivalents of Rectangular Ducts for Equal Friction—(Continued)

SIDE RECTANGULAR DUCT	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	42	44	46	48
26	28.1	28.6																		
28	29.1	29.7	30.2	30.8																
30	30.1	30.7	31.3	31.9	32.5	33.0														
32	31.1	31.7	32.3	32.9	33.5	34.1	34.6	35.2												
34	32.0	32.7	33.3	33.9	34.5	35.1	35.7	36.3	36.8	37.4										
36	32.9	33.7	34.3	34.9	35.5	36.1	36.7	37.3	37.9	38.5	39.1	39.6								
38	33.8	34.6	35.3	35.9	36.5	37.1	37.7	38.4	39.0	39.5	40.1	40.7	41.2	41.8						
40	34.6	35.3	36.0	36.7	37.4	38.0	38.6	39.3	39.9	40.5	41.1	41.7	42.3	42.9	43.4	44.0				
42	35.2	36.0	36.8	37.6	38.3	39.0	39.6	40.3	40.9	41.5	42.1	42.7	43.4	44.0	44.5	45.1	46.2			
44	36.1	36.9	37.7	38.5	39.2	39.9	40.5	41.2	41.8	42.5	43.1	43.7	44.3	44.9	45.5	46.1	47.2	48.4		
46	37.0	37.8	38.5	39.3	40.0	40.8	41.5	42.2	42.9	43.5	44.2	44.8	45.4	46.0	46.6	47.2	48.4	49.5	50.6	
48	37.8	38.5	39.2	40.0	40.8	41.5	42.3	43.0	43.7	44.4	45.0	45.6	46.3	46.9	47.5	48.1	49.3	50.5	51.6	
50	38.4	39.2	40.0	40.8	41.5	42.3	43.0	43.8	44.5	45.2	45.9	46.5	47.1	47.9	48.5	49.1	50.4	51.6	52.9	
52	39.1	40.0	40.8	41.6	42.3	43.1	43.9	44.7	45.4	46.1	46.8	47.5	48.2	48.9	49.5	50.1	51.3	52.5	53.8	
54	39.8	40.7	41.5	42.4	43.2	44.0	44.7	45.5	46.4	47.0	47.6	48.4	49.2	49.9	50.5	51.1	52.3	53.5	54.8	
56	40.4	41.3	42.1	43.0	43.8	44.6	45.4	46.2	46.9	47.7	48.5	49.1	49.9	50.6	51.3	52.0	53.3	54.6	55.9	
58	41.2	42.1	42.9	43.8	44.5	45.4	46.2	47.0	47.8	48.5	49.4	50.0	50.8	51.5	52.2	52.9	54.2	55.5	56.8	
60	41.8	42.7	43.6	44.5	45.4	46.1	46.9	47.8	48.5	49.3	50.1	50.9	51.6	52.3	53.0	53.8	55.0	56.4	57.9	
62	42.5	43.4	44.3	45.1	46.0	46.8	47.6	48.4	49.3	50.0	50.9	51.7	52.4	53.0	53.9	54.5	55.9	57.2	58.5	
64	43.1	44.0	44.9	45.8	46.7	47.5	48.4	49.2	50.0	50.9	51.7	52.4	53.2	53.9	54.7	55.4	56.8	58.1	59.4	
66	43.7	44.7	45.6	46.5	47.3	48.2	49.1	50.0	50.7	51.6	52.4	53.1	53.9	54.7	55.5	56.2	57.6	59.1	61.6	
68	44.4	45.3	46.3	47.2	48.0	48.9	49.7	50.7	51.4	52.2	53.1	53.8	54.6	55.5	56.2	56.9	58.4	59.9	61.3	
70	45.0	46.0	46.9	47.8	48.7	49.5	50.4	51.3	52.0	52.9	53.7	54.5	55.4	56.2	57.0	57.7	59.1	60.6	62.1	
72	45.5	46.5	47.5	48.4	49.3	50.1	51.0	51.9	52.8	53.7	54.6	55.4	56.2	57.0	57.8	58.7	60.0	61.3	63.0	

Continuation of the chart shown on the second page of this article.

corner, and you will find that this run takes an 8½-in. round pipe. If you want to use round pipe, it should be 8½, or use a 9-in., which is regular stock.

If you want to use a rectangular pipe, turn over the sheet to rectangular equivalents. If you want this pipe five inches deep, find 5 at the top and run down to as near as possible to 8½, and we come to 8.3, and the next is 8.7. From this line, run over to the left and find approximately 12½-in., which is the other measurement for the pipe, making it 5 by 12½.

Now go back to the friction chart at the intersection of 160 c.f.m. and 400 velocity, and follow this line to the bottom of the page, and you will find that the friction per hundred feet is .05.

In order to maintain the same friction per foot, we will have to stay on this same line of .05 to arrive at all other pipe sizes, including velocities.

The next room has a heat loss of 8,658 B.t.u., which requires 113 c.f.m. Find 110 at right side of

friction chart, and follow left to friction line of .05, mentioned in previous paragraph, and we find on the lines running to the upper right that this line is equal to a 7½-in., and running to the upper left, we note a velocity of 350 f.p.m. Its equivalent in rectangular pipe would be either 5 by 10, or 6 by 8.

Now, with these two runs, we start the main on the way to the furnace. This main duct at this point would handle 276 c.f.m. Referring to friction chart, 280 c.f.m.

intersects .05 friction at a 10½-in. pipe, and the velocity would be 480 f.p.m.

Continuing, the chart below shows how each branch figures out, and also how the main builds up as it goes along.

From the table, you will notice that this job requires 1024 c.f.m. Before the blower can be ordered, it is necessary to estimate the static pressure on the job. To arrive at static pressure, take the run with the greatest friction, which in this

B.t.u.	C.f.m.	Vel.	S.P.	Rd. Pipe	
12543	163	400	.05	8½-in.	
8658	113	360	.05	7½-in.	
21201	276	480	.05	10½-in.	Main duct 10 by 10
7000	91	335	.05	7 -in.	
28201	367	520	.05	12 -in.	Main duct 12 by 10
11022	143	400	.05	8 -in.	
39223	510	550	.05	13 -in.	Main duct 14 by 10
9000	117	360	.05	7½-in.	
48223	627	580	.05	14 -in.	Main duct 17 by 10
9200	120	350	.05	7½-in.	
57423	747	620	.05	15 -in.	Main duct 19 by 10
8350	108	350	.05	7 -in.	
13000	169	420	.05	9 -in.	
78773	1024	660	.05	17 -in.	Main duct 25 by 10

case happens to be the one on the end to the right.

Inasmuch as the job is designed for equal friction per foot of length, it is now necessary to get the total equivalent length from the furnace to the register, adding for turns. An elbow with a radius equal to the diameter of the pipe has friction equal to ten diameters.

The main starts out equivalent to a 17-inch pipe. Seventeen times 10 are 170 inches. Divide this by 12 and we have 14 feet. On the other end, we have two $8\frac{1}{2}$ -in. elbows; $8\frac{1}{2}$ times 10 times 2 divided by 12 equal 14 feet. Length of main from furnace to end of last run is 40 feet. Total equivalent length 68 feet; 68 divided by 100 equal .68; .68 times .05 equal .034.

Returns should be figured same way. Inasmuch as returns are not shown, we can safely assume that friction in returns will be about same as in warm air side, which will give us .068.

To this, we must add friction through furnace and blower and registers, which would not be over .05. With the heat in a furnace aiding circulation, the friction through a furnace in winter is slight. Now we have a total of .118, or practically one-eighth inch. It will take a pretty good sized job to give more static than this. Of course it will be a little more in summer than in winter, because in summer there is no heat in the furnace to aid circulation.

So, we order a blower which will develop 1000 to 1100 c.f.m. against one-eighth-inch static pressure.

Be sure the blower you buy will not run so fast that it will be noisy. Some blower wheels will stand higher speeds than others without making noise.

The question of noise is one of the most important things to take into account in buying a blower. Noises may be from many different causes. Some bearings are noisy. Some bearings are quiet when you buy the blower, but may not always be so, depending on whether the fan wheel has more strain on one bearing than on the other; and a bear-



Fred R. Bishop

ing may become noisy through lack of lubrication. Some bearings are naturally noisy.

Another cause of noise is air rush. If you have $\frac{1}{8}$ -in. static on a job, do not use a blower speeded against $\frac{1}{4}$ -in. If you do, it will send too much air through the job and cause a greater load on the motor than was figured. If blower is delivering too much air, the volume can be decreased by using a smaller pulley on the motor. If you use one particular make of blower, it would be well to have a few different size pulleys on hand. It is easier to correct an error of too much air than it is where there is not enough. If you haven't enough, it is possible that the motor is too small.

Do not install a return face directly over a blower. No matter whose blower you use, you will get a reaction with such an installation.

The blower will have to be insulated in some way from the piping to deaden noise. When I say noise, I don't mean much noise—just something to aggravate an owner. I have seen blowers used on which owners complained of noise when you and I would not know there was a blower in the house. When machinery is running, it is absolutely impossible to eliminate all sound. At the present time, owners don't mind the hum of the refrigerator, but that point has not

as yet been reached in blowers. I mention these things because you will experience them.

The next thing is blower control. What good would a refrigerator be if it did not have electric control? You wouldn't have an oil burner that was not automatic. This is equally important in a blower.

A thermostat is always recommended to operate the dampers and control combustion.

A furnace switch should be on every furnace with a blower. This turns on the blower when the temperature of the bonnet raises to a predetermined point. It also has a shut-off to stop the blower when the temperature of the bonnet gets to a predetermined low point. It should also be in series with the thermostat to turn off the blower when the thermostat closes the dampers. This prevents overheating.

Another important thing to do is to locate the thermostat in the room that is apt to cool first. This affects the thermostat as soon as this room needs heat. The balance of the house can be dampered down to meet this room's requirements. This is one of the most essential points to consider in designing a blower job.

Also install manual switch in hall or stairway for summer use.

Another thing—don't overlook dampering every warm air outlet from the main duct so as to be able to equalize the entire house on the warm air side. No matter how well the job has been designed, it is usually necessary to make some damper adjustments.

Dampers also apply to returns. It is just as important to damper returns as it is warm air outlets.

Baffling casings is another thing that has to be done. Casings on blower jobs should be baffled to equal practically the same free area as warm air duct. Baffling should be uniform so there is the same space at all points between the casing and furnace. Baffles should be closed at top or bottom or both between them and casing.

Be sure in buying a blower that the ratings are guaranteed.

Need a Good Door Opener?

ARE you looking for a good door opener for use in your canvassing?

If so, try out an inexpensive, but good looking, thermometer. Get the kind which can be printed with your business name, your business address and phone number, and a word or two of advertising telling what you can do.

One aggressive contractor in Pennsylvania tried out this door opener last winter and reported that his thermometer got his solicitor into more homes than any plan he had tried out.

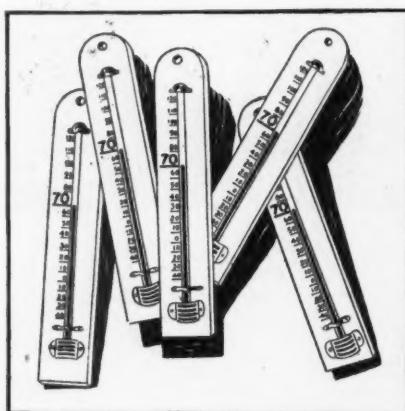
Here is how he worked the thermometer plan. He bought a good looking thermometer mounted on a stiff celluloid frame. Below the thermometer he had his name, address and phone number printed, and below that a catch line which he uses to advertise his business.

Then above the tube he had this line printed—

A Good Furnace Will Keep You Warm

Then, as an additional pointer to attract the owner's attention, right alongside the 72 degree mark this was printed in small type—

"Regardless of weather, you should be able to keep your house at this temperature."



With a supply of thermometers the canvasser called on NEW prospects. He introduced himself and briefly told who he represented, what business the firm was in, and wherever possible explained that one of the firm's customers was

"right in this block," or nearby.

The solicitor explained that he was giving away the thermometer in exchange for the privilege of looking over the furnace. The suggestion was made that the thermometer be hung in "such and such" a spot—the solicitor choosing a location which was likely to be hard to heat.

The meat of the sales talk was this—"If your furnace is in good condition and the system is designed correctly, no trouble should be had in keeping inside temperatures at 72 degrees. If you have trouble doing this, probably some changes in the system or a job of cleaning or resetting should be done."

The suggestion was made that the home owner hang the little thermometer and check the furnace operation against the thermometer. If it proved impossible, or expensive, or difficult to keep temperatures at 72, the "So and So" firm will be glad to recommend changes.

Home Building Shows Work for You

WIDE awake warm air heating contractors desirous of putting their firms before the public will do well to consider the advantages of displaying at building material and home building shows, is the recommendation of the Mid-West Heating and Service Company, Indianapolis, Indiana.

The photograph shown here is an exhibit of the Mid-West company at the Builders Show held April 11 to 18 in Indianapolis. This show was staged in a large exhibit hall.

It is interesting to note that the company displayed the very latest units. This was done purposely in order to capitalize on the present interest in forced air, cleaned air and painted casings.



Appeal is strengthened by making the setting as comfortable and restful as possible. Visitors can sit and talk

Make Your Window Help Sell!

ATTRACTIVE window displays are one feature of present-day selling which the live warm air heating contractor cannot overlook. Those firms which have trimmed up their windows are quick to tell of the advantages such effort brings. That the heating man can arrange a window which attracts the passer-by has been definitely established.

Shown here is a window which has been doing a real selling job for its owner, the Gund Sheet Metal Works of St. Louis, Mo. The window exemplifies the aggressive sales policies of this firm.

The heart of the display is an El Capitan furnace of the Midland Furnace Company. The features of the furnace are pointed out by the use of window stickers joined to the parts of the furnace the contractor talks about. These glass stickers are large sized with large and easily read printing so that the passer-by can read without trouble.

A feature worth noting is that



these stickers are placed toward the top of the glass so that the interior of the window is not cut off.

In addition to the furnace, other products such as heating accessories like registers and grilles and some of the sheet metal work the firm is

equipped to do are shown.

It should be noted that signs are prominently used, especially the sign stating that terms are available.

The slogan of this firm is "Yours For Cleaner Heat." This is painted on the glass in large letters.

Don't Forget Your Old Customers

WHEN you are planning your selling effort for this spring and allotting expenditures for direct mailing—don't forget that your best prospects are your old customers.

Don't think that you know all about old customer's heating and equipment and that, therefore, there isn't any service you can offer him.

If you fail to make your old customer feel that you are always interested in his equipment and your obligation to him, the old customer becomes a good prospect for some other heating man.

It costs a lot of money, relatively speaking, to put a new customer on your books. Not only does it take added effort to swing him over

from another contractor, but you have to sell the new customer on your responsibility, your service.

The old customer, on the other hand, knows what you can do and have done. Few of them have made use of all your service, regardless of how extensive is the equipment you installed. For instance, contractors who have installed complete automatic heaters with forced air and washers or dry filters can still return to change dry filters or to inspect and regulate the other parts of the installation.

Most contractors who have made a success of selling effort divide their prospects into two classes—old customers and new prospects.

Old customers are visited on

friendly terms, the salesman can introduce himself as representing you and state that he wants to see if everything is going nicely. With such an introduction it is easy to talk about automatic humidification if such is not in use, or a house thermostat, or a furnace regulator, perhaps an added warm air run or more return air to make every room 100 per cent satisfactory.

This same procedure cannot be followed with mail prospects, for first they must know who and what you are, what you have and can do, what sort of a person you are, and what kind of men you employ. Then you can begin to talk business.

Old customers are especially logical as prospects for cleaning.

FAN BLAST ENGINEERING

By PLATTE OVERTON
Heating Engineer

WHEN we design our heating and ventilating system for school (see May 11th issue, AMERICAN ARTISAN) it must be remembered that each room to be heated must have one or more inlets for the warm air and one or more exhaust openings or vents. The larger the room the more supply grilles or warm air inlets and exhausts necessary.

In the average class room 30 or 32 feet long by 20 to 24 wide one inlet and one exhaust or vent may suffice. Two inlets with one vent or two vents with one inlet is preferable if well arranged, but in case the space or arrangement is impossible one inlet and one exhaust may be used. These openings should if possible be kept clear of room corners by at least 2 feet.

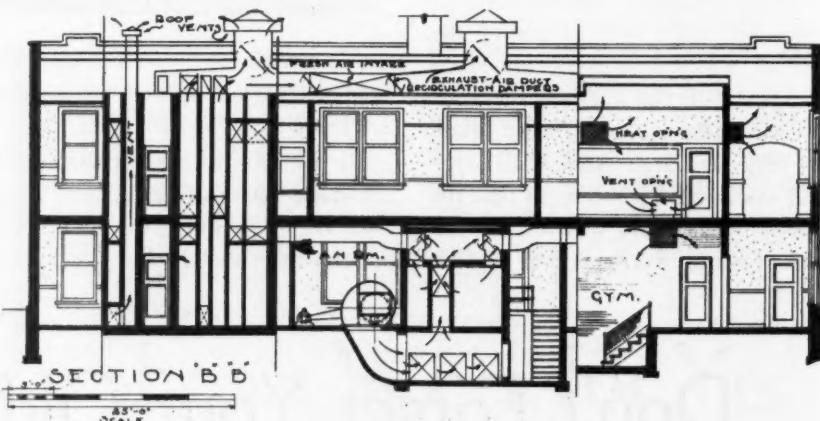
The sketches "A," "B," "C" show desirable locations for the supply and vent openings.

Our risers or flues for the supply

air should be designed for a velocity of 450 to 550 feet per minute where sheet metal risers are used. Where plastered brick risers are used, as in the above plan, velocities of 300 to 400 feet per minute are best, due to the roughness of the flues.

Our exhaust or vent flues may be designed to a velocity of 250 to 350 feet per minute, the lower velocity for the second floor rooms and the higher velocity for the first floor

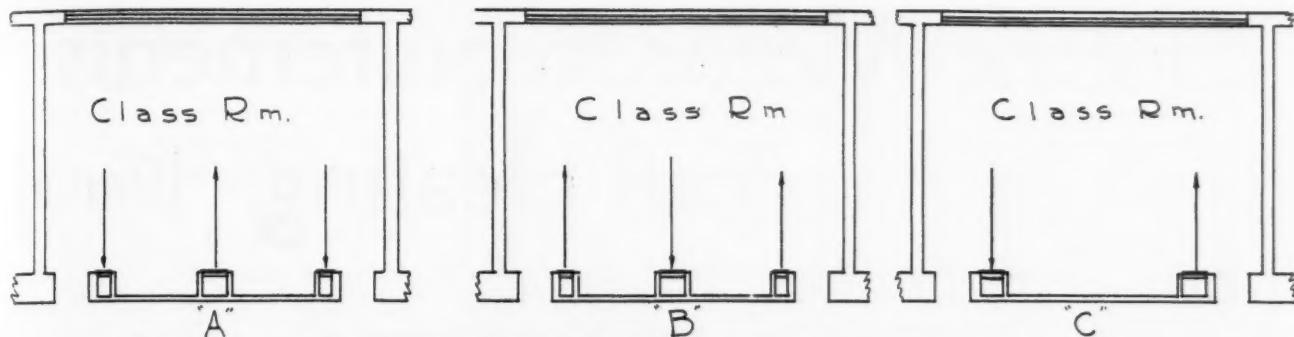
rooms. It must be remembered that our supply flues have mechanical supply but our exhaust or vent flues have only gravity velocities. It is generally assumed that 80 per cent of the supply air is exhausted. This is due to the varied density of the air and it is a safe rule to design the supply and vent flues the same size for the first floor and one brick or 4 inches larger on second floor. In the case of the laboratory, the



Cross-section through the building showing location of risers and vents

File No. <u>20</u> Based on <u>20</u> °F. Cold Weather & Prevailing Wind From <u>W</u>															
Exposure Factors	Rooms No.	1	2	3	4	5	6	7	101	102	103	104	105	106	TOTALS
MEASUREMENTS															
1. Room Dimensions	65' x 16' 9" x 20' 18' x 18' 6" 9' x 20' 18' x 18' 6" 9' x 52' 6" 9' x 52' 6" 65' x 16' 20' x 18' 6" 25' x 18' 6" 20' x 18' 6" 9' x 11' 9' x 11'														
2. Cubic Foot Space	257043 1980 3663 1980 3663 7935 7935 2858 4920 5556 4920 7935 7935 310 310														
3. Room Area	4128 129 129 129 129 129 129 129 129 129 129 129 129 129 129 129														
4. Floor Const. & Factor	51-15.3 56-27.4 56-27.3 56-27.3 51-12.2 56-20 56-20 56-20 56-20 56-20 56-20 56-20 56-20 56-20 56-20 56-20														
5. Ceiling Const. & Factor	16-11.5 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8														
6. Window Const. & Factor	16-11.5 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8 16-10.8														
7. Wall Const. & Factor	25-22 25-21 25-21 25-21 25-21 25-21 25-21 25-21 25-21 25-21 25-21 25-21 25-21 25-21 25-21 25-21														
8. Exposed Sash and Door Perimeter, equiv.	2.12 2.28 2.28 2.28 2.28 2.28 2.28 2.28 2.28 2.28 2.28 2.28 2.28 2.28 2.28 2.28														
9. Leackage, T. U. of It. of Perimeter	2.20 2.20 2.20 2.20 2.20 2.20 2.20 2.20 2.20 2.20 2.20 2.20 2.20 2.20 2.20 2.20														
10. Total Wall Gross Area	916 515 515 515 515 515 515 515 515 515 515 515 515 515 515 515														
11. Exposed Wall Gross Area	916 515 515 515 515 515 515 515 515 515 515 515 515 515 515 515														
12. Exposed Wall Net Area	498 287 287 287 287 287 287 287 287 287 287 287 287 287 287 287														
13. Exposure Direction	5 A.W.														
14. Room Temperature	70° 70° 70° 70° 70° 70° 70° 70° 70° 70° 70° 70° 70° 70° 70° 70°														
HEAT LOSSES															
15. Wall Loss B. t. u. per Hr.	10890 6027 1974 6027 1974 15901 15901 10569 2856 2856 2856 2856 2856 2835 2835														
16. Window Loss B. t. u. per Hr.	24574 24574 24574 24574 24574 24574 24574 24574 24574 24574 24574 24574 24574 24574 600 600														
17. Subtotal Loss B. t. u. per Hr.	15813 5455 5455 5455 5455 5455 5455 5455 5455 5455 5455 5455 5455 5455 1222 1222														
18. Expos. Allow. B. t. u. per Hr.	2048 2048 2048 2048 2048 2048 2048 2048 2048 2048 2048 2048 2048 2048 500 500														
19. Floor Loss B. t. u. per Hr.	9928 4032 4032 4032 4032 4032 4032 4032 4032 4032 4032 4032 4032 4032 212 212														
20. Ceiling Loss B. t. u. per Hr.	32640 3360 3360 3360 3360 3360 3360 3360 3360 3360 3360 3360 3360 3360 2376 2376														
21. Lockage Loss B. t. u. per Hr.	104338 1913 31340 1913 31340 1913 31340 1913 31340 1913 31340 1913 31340 1913 31340 31979 31979														
22. Total Heat Loss	104338 1913 31340 1913 31340 1913 31340 1913 31340 1913 31340 1913 31340 1913 31340 31979 31979														
23. Defect for Heater Size	13720 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800 1800														
24. Heater Building Loss	88018 1800 176900 176900 176900 176900 176900 176900 176900 176900 176900 176900 176900 176900 176900 176900 176900 176900														
SERVICE															
25. Air Supply C. F. M.	4086 424 666 418 666 1683 1683 4094 740 1029 740 205 205														
26. Recirculation C. F. M.	93.8 120° 120° 120° 112° 120° 120° 1032 120° 120° 120° 120° 120°														
27. Air Supply Inlet Temp.															
28. Air Supply B. t. u. Service															
29. Air Supply B. t. u. Service															
30. Direct Radi. eq. ft.															
31. Grav. Ind. Radi. eq. ft.															
32. Aspir. Coil Radi. eq. ft.															

Above is shown the data sheet completely filled in for this building. Every item of heat loss is accounted for. The filled-in sheet is a detailed picture of the heating requirements.



These three plans show desirable locations for supply and vent openings

vent flue is made larger than the supply to create an "in" draft when the doors are opened to prevent the odors from this room getting into other parts of the building. This holds true for toilet rooms also.

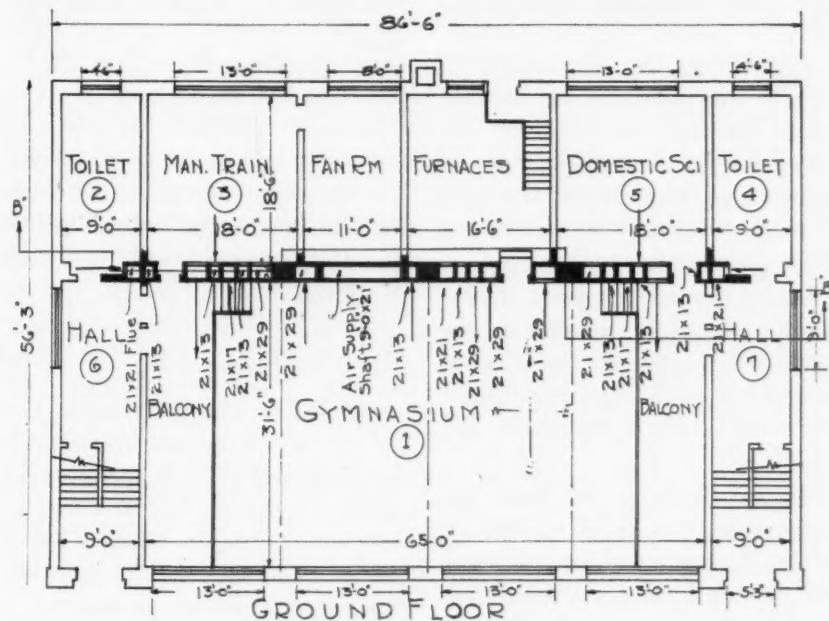
Our partition wall where we must locate our flues is 30 inches thick. If we leave a 4-inch wall on each side we have 22 inches left or 21 inches, conforming to standard brick measure. Hence all of our flues will be 21 inches deep. We must space out all of our flues in the space available and leave bearing walls for the girders that hold the gym and assembly wall ceilings.

The supply flue for the first or ground floor will terminate on that floor and the space above may be used for second floor vents. To design our supply flues we may use Room 102 as an example. Our c.f.m. supply is 740. With a velocity of 400 feet per minute we have 740 divided by 400 equals 1.85 sq. ft., or flue 13 by 21, conforming to standard brick measure. For the

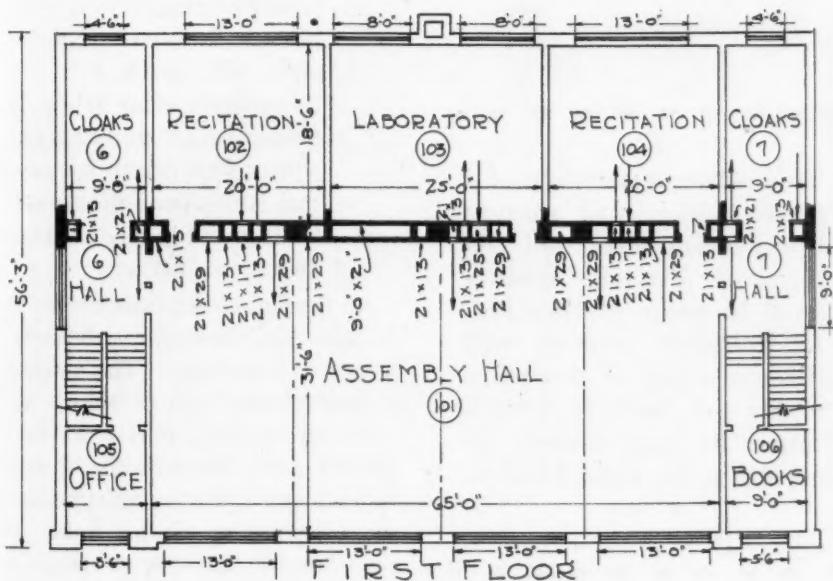
exhaust flue or vent from this room we have 80 per cent of 740 or 592 c.f.m., divided by 250 equals 2.36 sq. ft., or flue 17 by 21, conforming again to standard brick measure.

Our outside air supply from the attic must also come down in this flue space. This flue or shaft may

be designed for a velocity of 1,000 feet per minute. As we are using all outside air, the temperature in this shaft will vary from 10 below zero to 70 degrees above in the heating season, or we will assume a mean temperature of 40 degrees for the heating season.



Above and left are plans showing locations of supply and vent grilles with their sizes and sizes of supply risers



Our data sheet shows that we supply 16,639 c.f.m. at an average temperature of 115 degrees. Air at 115 degrees weighs .069 pounds per cubic foot. Air at 40 degrees weighs .079, and .069 divided by .079 equals .873, or .873 per cent of the volume of supply or 14,500 c.f.m. in the intake shaft; 14,500 divided by 1,000 equals 14.5 sq. ft. for this shaft.

The section "B"-B shows various sections through flues, fan room, heater room, and gymnasium.

Electric Motor Requirements In Modern Heating [Part I]

By H. WEICHSEL

Consulting Engineer Wagner Electric Corp., St. Louis

DURING the last 10 to 20 years, the field for electric motor applications has increased rapidly. Frequently the industry to which the electric motor is to be employed is not sufficiently familiar with electric motor characteristics to select the most suitable motor. For this reason in the majority of cases it will be found essential that the engineer familiarize himself sufficiently with the character of the industry in which the motor is to be employed in order to be in a position to select the type of motor most suitable to the special requirements.

During the last few years, an industry which is tremendous in scope has begun to use electric motors to a much larger extent than previously. This is the heating industry.

Before discussing in detail the improvements made in the art of heating by the application of electric motors, it is desirable to discuss briefly some of the fundamental relations and laws which govern any heating system. Some of the items which will be mentioned may not have a direct bearing on the design of a suitable motor for a heating plant, but are of such a general nature that the electrical engineer should be familiar with them in order to be able to converse intelligently with the heating engineer.

It is a well-known fact that specific heat, weight, and other characteristics of air are a function of the pressure and temperature to which the air is submitted.

In heating installations the problem can be greatly simplified by

using air constants corresponding to normal atmospheric pressure (14.7 pounds per square inch) at a temperature of 70 degrees F. With this simplified assumption, calculations can be carried out for air as if it were a liquid.

It is necessary only to introduce the numerical values for its physical properties, such as weight per cubic foot, specific heat, etc., at 70 degrees F. and atmospheric pressure. For these conditions we find that one cubic foot of air weighs .07495 pounds and requires .01812 B.t.u. to raise the temperature 1 degree F. The specific heat of the air is, therefore,

$$\frac{.01812}{.07495} = .242$$

which means that *55.19 cubic feet of dry air at normal atmospheric pressure and at a temperature of about 70 degrees has its temperature raised 1 degree if one B.t.u. is added*. This is a fundamental figure and is extremely important.

Some further data are necessary in order to familiarize ourselves with the properties of air. For a

given pressure, the volume of air per pound increases with temperature and the pressure per pound of air has been found to be proportional to the so-called absolute temperature, which is equal to the measured temperature in degrees F. plus 459.6. For normal atmospheric pressure, which is 14.7 pounds per square inch or 2120 pounds per square foot, the relation exists:

$$V = \frac{53.35 T}{2120} = 0.25 T \text{ absolute}$$

If at a given temperature the pressure is changed, the volume of one pound of air decreases with increasing pressure. For twice the pressure, the volume is one-half. For three times the pressure, the volume is one-third, etc. Consequently, the equation can be written:

$$V \text{ cu. ft.} = 53.35 \times \frac{T}{P}$$

where

V = volume in cubic feet of one pound of air.

T = absolute temperature of the air = 459.6 + deg. F.

*t*_f = temperature of air in deg. F.

P = pressure in pounds per square foot, which for normal atmospheric pressure is 2120 pounds per square foot.

All the figures mentioned refer to dry air. Air, however, has the property to absorb water. The amount of water it can hold or absorb depends on the atmospheric pressure and the temperature of the air. If for a given condition of pressure and temperature the air holds as much water as it can possibly

▼▼▼▼▼▼▼▼▼▼
This is the first article of a series which will discuss the development and design of electric motors used in warm air heating. Preliminary articles will discuss some of the principles of heating which must be considered in adopting the right kind of a fan
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carry, we say the air is saturated.

If it is stated the air is 20 per cent saturated or has a relative humidity of 20 per cent, it is meant the amount of water in the air at that temperature and pressure is only 20 per cent of the amount it can hold at the same temperature and pressure when fully saturated and the space occupied jointly by air and water vapor is kept constant. It is amazing how rapidly the relative humidity changes with temperature.

One cubic foot of air plus water vapor when saturated holds one-half grain of water at zero deg. F. One cubic foot of air plus water vapor when saturated holds 8 grains of water at 70 deg. F. Consequently, if a certain space contains saturated air at zero deg. F., it has only

$$\frac{.5}{8} = 6.3 \text{ per cent}$$

relative humidity when heated to 70 deg. F. By heating the air from zero deg. to 70 deg., the relative humidity has fallen, therefore, from 100 per cent to 6.3 per cent.

Taking as an example the case where one cubic foot of air plus water vapor is saturated at a temperature of 70 deg., that is, contains 8 grains of water, and this air is heated to 85 deg., it will be found that the humidity has changed from 100 per cent to 61.5 per cent because at 70 deg. the saturated air holds 8 grains of water per cubic foot and at 85 deg. the air holds 13 grains of water when saturated. These two examples clearly show how rapidly the relative humidity changes with temperature if the total water content is not changed. It will be shown later that the relative humidity of the air is an important factor in a heating installation.

Another interesting fact is that a cubic foot of dry air is heavier than a cubic foot of saturated air if both are kept at the same temperature and pressure. This interesting relation can be seen from Fig. 9.

The most convenient method for

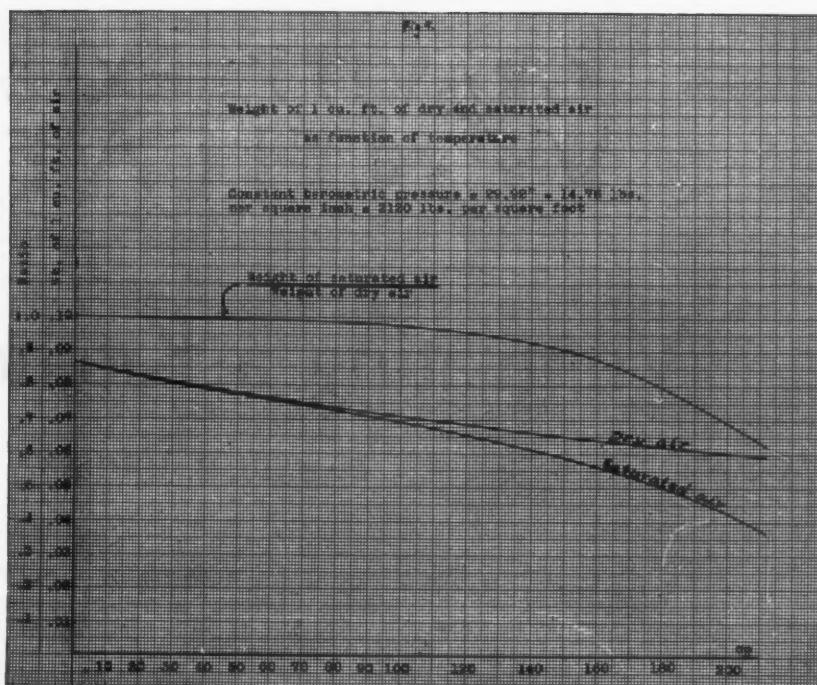


Fig. 9—This chart shows the relation by weight of dry and saturated air. Contrary to popular opinion, Mr. Weichsel says, dry air is heavier than saturated air at the same temperature and pressure

determining the relative humidity in the air consists in the use of the dry and wet bulb thermometers. The dry bulb thermometer is a standard thermometer. The wet bulb is also a standard thermometer, but its mercury bulb is surrounded with cloth saturated with distilled

water. A convenient arrangement for taking such readings is a so-called sling psychrometer.

The wet bulb thermometer gives a lower reading than the dry bulb and a definite relation exists between these readings and the humidity of the air.



SELLING HELPS

You may have noticed the pages devoted to business building ideas. These are open to everyone. If you have found some good selling or advertising idea, let us hear about it. Co-operative effort will help all of us.



Ventilating a Kitchen Stove

PROVIDING ventilation for home kitchens is a field which many sheet metal contractors have found profitable. In most instances such systems are simple to install and entail little or no after trouble. Occasionally, however, something goes wrong and experience must be called upon.

For instance, one reader writes as follows:

AMERICAN ARTISAN.

Gentlemen:

I am a reader of the AMERICAN ARTISAN engaged here in Potter, Wisconsin, in sheet metal work. I have a problem in which an exhausting hood is used over an oil range in a customer's kitchen. There seems to be a down draft in the ventilator and I don't seem to be able to overcome it.

A sketch of the layout is enclosed. There is a 4-inch gravity ventilator at the top of the stack. The hood is 15 by 22 inches in area and is 4 inches deep around the sides.

The trouble lies in a failure of the system to completely exhaust the fumes and oil smoke. Also there seems to be a down draft in the stack.

Yours very truly,
(Signed) A Reader.

We should like to get any reader's opinion or experience on this problem. In the meantime here is what Paul R. Jordan says about the trouble:

Your Wisconsin reader states he has down drafts through this ventilator. There is nothing in his

tional area, giving him a ratio of about 1 to 26.

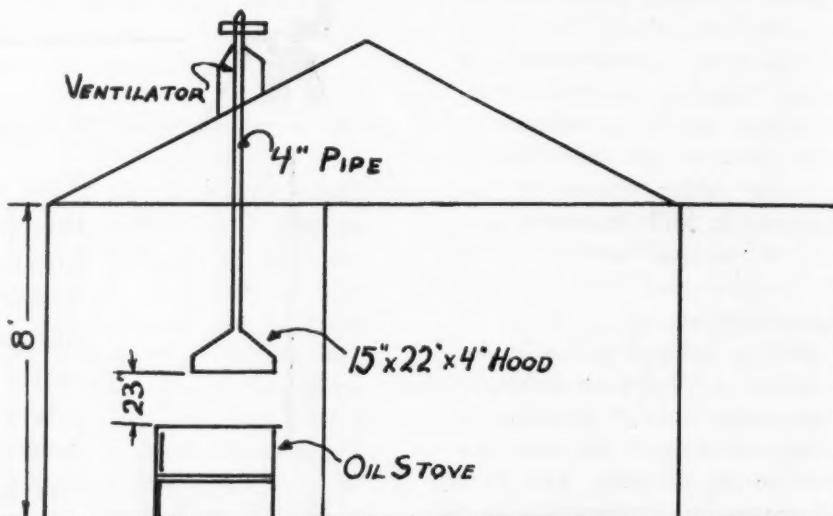
Your reader has not given us the size of this ventilator so we cannot tell whether the ventilator he now has is big enough to take care of the pipe as it should be. I would suggest an 8-inch pipe (50 sq. in.) hooked up to at least an 8-inch ventilator for a 1 to 6.4 ratio. A larger ventilator will not do any harm and may even help.

The proposition of making this ventilator work may be a rather large order, if it is a home-made ventilator. However, if it is a manufactured ventilator, I see no reason why it should not give fairly satisfactory results with a proper hood ratio.

Now as to the hood ratio, for gravity systems this should be not less than 1 to 10, and perhaps as great as 1 to 5. He has 330 square inches of hood area. A 4-inch pipe will have about 12.56 inches of sec-

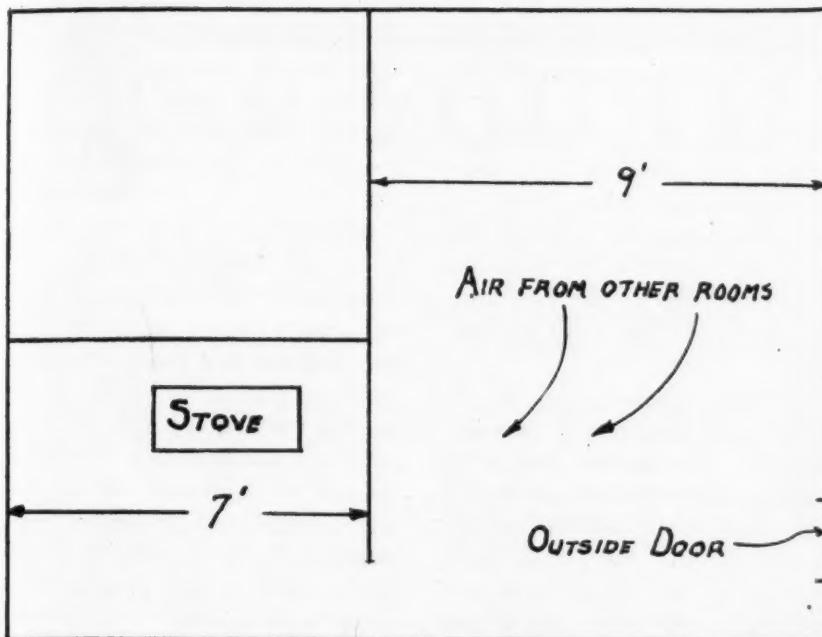
ondary air. This gives a ratio of 26 to 1. This is not good enough. The reader should have a 4-inch pipe and a 15 x 22 x 4-inch hood. This gives a ratio of 10 to 1. This is good enough.

From the drawing it looks as if the hood were not large enough to cover the stove burners. A hood



This elevation shows the layout of the house with the stove, hood and connection to the roof ventilator. Suggested changes to improve the operation of the system are related in the text.

*The Paul R. Jordan Co., Indianapolis, Indiana.



Here is the layout of the kitchen showing possible conflicting air currents from doors and windows.

23 inches above the stove cannot be expected to draw smoke and

fumes to it from any great lateral distance. It may be necessary in

order to get good results to increase the size of the hood. However, an increase of the pipe together with a proper ventilator will doubtless insure satisfactory operation of the present hood, as far as it goes.

Adverse wind action inside the room will, of course, blow smoke and fumes about the room. This can be nullified to a great degree by dropping the back and two sides of the hood down entirely to the stove, and dropping down the front as far as possible.

This problem presents the usual phase of incorrect hood ratio. The hood ratio on a gravity job should range not less than 1 to 10 and as high as 1 to 5 on occasion. Where fan ventilators are used hood ratios may be one-half of the above, namely as low as 1 to 20, with 1 to 10 as high as need ordinarily be used.

What Advantages Has the Fan Ventilator?

A reader who expresses an interest in the possibility of selling smaller sized ventilation systems where intricate engineering is not essential sent in this query:

"I have seen fan ventilators advertised in your publication. What is a fan ventilator and how does it compare with pressure fan and gravity ventilators; also what advantages does it have which the sheet metal contractor can talk about?"

The fan ventilator is a fan installed in a ventilator, giving combined fan and ventilator action. A combination of these two elements is peculiarly valuable on account of the way that each helps the other.

A ventilator with a fan in it will naturally handle more air than the ventilator without the fan. It is also more positive in action and does not depend on outside weather conditions for its efficiency. Therefore, it is less variable and more consistent in performance.

The so-called gravity ventilator has many uses, and in its own field

is a device whose practical features cannot be bettered by any other exhausting unit. There are places, however, where a higher efficiency and more constant performance are desirable, even at added expense. In this latter case, it is natural to turn to the fan.

A fan installed in the ventilator makes an excellent exhausting system in many important respects. For instance, the fan ventilator has the advantage over a side wall exhaust fan because it is a low pressure system rather than a high pressure one.

The low pressure fan costs less than the high pressure, both in the initial layout and in operating cost. Air pressure varies as the square of the velocity. I am told that current consumption varies approximately as the cube of air velocity. This means that if you increase a certain air volume from 1000 feet per minute to 3000 feet per minute your air turnover is three times as great, but your current consumption is 27 times as great.

High velocity, even at considerable expense, is desirable on tall buildings where duct sizes are of great importance. On one-story, two-story, or even on three-story buildings, however, the low pressure fan can be just as practical.

The fan ventilator is simply a low pressure exhaust fan, exhausting in a vertical position, and using a regular gravity ventilator for an exhaust head. It consists of a ventilator base with a vertically operating motor mounted in it, a propeller type fan attached directly to the motor shaft, and the whole capped with a regulation gravity ventilator. The ventilator must have exceptional free area in order to eliminate back pressure. The motor must be an especially built motor for vertical operation, with proper provision for thrust and for lubrication. The fan must be designed for the motor speed and motor power of its motor, and the blades must not be so wide as to interfere with gravity action when the motor is not running. At the same

time the blades must be of a design capable of delivering air against a certain amount of static pressure without back circulation through the tips and center.

Low pressure fans are often used for side wall installations but they should not be so used if fan ventilators can be used.

Many of these unsatisfactory wall exhaust fan installations are due to wind interference and to proper location. A low pressure fan exhausting toward the wind simply does not exhaust. It must be equipped with weather louvers and these louvers will be closed by the wind, killing the action of the fan.

Wall fans installed for heat removal often are set too far below

the ceiling, leaving a hot dead air pocket above the fan. This, of course, defeats the purpose of the fan.

Frequently the fans installed in outside walls are likely to be close to windows and doors which are kept open during the summer, giving a short circuit of air from one or two openings to the fan, leaving the rest of the room unventilated.

The fan ventilator can be installed to overcome all of these objections. The harder the wind blows, the better it works, no matter what direction the wind is blowing. It can tap into the ceiling itself and remove the hot air from the very top of the room; and it can

be installed at any point on the roof, so that air coming to it from the various intake openings of the room will sweep the entire room in any manner desired. Also, it may be hooked up with roof space ventilation.

In addition to these advantages it has an advantage of its own, namely that when the fan is shut off gravity action continues. In heat removal this gives a valuable action all during the night. In industrial ventilation it offers a very practical combination of a nominal amount of ventilation all of the time through gravity action, augmented with the snapping on of the fan to handle a very great volume when that is desired.

Illinois Contractors Hold 18th Annual Convention

ON Tuesday, May 12, sheet metal contractors of the Illinois association held their state meeting. This convention of Illinois contractors preceded the convention of the national association. In view of the national convention which was to follow, the Illinois program was given over chiefly to business matters.

The convention was opened by an address of welcome by George Krutzkoff, chairman of the joint convention committee. In welcoming members to Chicago, Mr. Krutzkoff stated that he was glad to see so many members present in view of the larger program which would convene the next day, and assured members that the Chicago association extended a most cordial welcome to the men and ladies. Mr. Krutzkoff said that an extensive program of entertainment and a live number of subjects by recognized speakers had been arranged and that he was sure everyone pres-

ILLINOIS STATE OFFICERS

PRESIDENT

Frank I. Eynatten

VICE-PRESIDENT

John W. Thompson Chicago

SECRETARY

Clarence Nelson Peoria

TREASURER

James Barrett Alton

DIRECTORS

Same as 1931

counted for the flags, bunting and celebration.

The minutes of the last meeting were read by the secretary and approved by the members. Secretary-Treasurer Radtke then read the financial report, which was also approved.

Committee meetings were held following the appointment of the committees by the president and the meeting was adjourned for lunch.

In the afternoon the committees appointed presented their reports, following which next year's convention city was discussed. No decision was reached and it was voted to let the Board of Directors select the convention city at their next meeting.

Following this discussion the election of officers was held. The officers elected are shown in an adjoining column.

After some discussion on business in general the meeting was adjourned to meet the following day as a part of the national convention.

ent would enjoy a most profitable visit.

The response to Mr. Krutzkoff was given by Joe Walters, President of the Illinois association.

The president then called upon George Harms for a word and Mr. Harms made quite a hit by pointing out that the city of Chicago had decked itself out in gala attire in honor of the convention. It turned out, however, that Chicago was staging a jubilee week, which ac-

CAN YOU TELL ME?

Gas Fired Radiator

From J. A. Dart & Sons, Port Huron, Michigan.

Who manufactures a gas fired radiator for room heating?

Ans.—James B. Clow & Sons, 201 North Talman Avenue, Chicago, Illinois.

"Arex" Ventilator

From J. G. Harbauer, Havana, Illinois.

Who manufactures the "Arex" ventilator?

Ans.—Arex Company, 333 North Michigan Avenue, Chicago, Illinois.

Address of Aluminum Co.

From Robert A. Cox, Savannah, Georgia.

What is the address of the Aluminum Company of America?

Ans.—Oliver Building, Pittsburgh, Pennsylvania.

Auxiliary Heat Savers

From J. V. Patten Company, Sycamore, Illinois.

Who manufactures auxiliary "heat savers" for use in connection with ordinary warm air furnaces with oil burners?

Ans.—Draft Adjustor Corporation, 215 North Michigan Avenue, Chicago, Illinois.

Automobile Fenders

From West Akron Sheet Metal Company, Akron, Ohio.

Who manufactures automobile fenders?

Ans.—Auto Lamp & Radiator Company, 1614 Prospect Avenue, Cleveland, Ohio; Lima Sheet Metal Products Company, Lima, Ohio; Mullins Manufacturing Corporation, 1018 Mills Street, Salem, Ohio.

"E-Z" Chimney Cleaner

From Allegheny Furnace Repair Company, North Side, Pittsburgh, Pennsylvania.

Who manufactures the "E-Z" Chimney Cleaner?

Ans.—Healy-Ruff Company, 797 Hampden Avenue, St. Paul, Minnesota.

Metal Weather Stripping

From E. C. Lougher Roofing & Heating Company, Ithaca, New York.

Who manufactures weather stripping?

Ans.—Allmetal Weatherstrip Company, 229 West Illinois Street; Chamberlin Metal Weatherstrip Company, 704 South Dearborn Street; Federal Metal Weatherstrip Company, 4538 Fullerton Avenue; all of Chicago.

Furnace Vacuum Cleaners

From Wells & Wade, Wenatchee, Washington.

Who manufactures furnace vacuum cleaners?

Ans.—Breuer Electric Vacuum Cleaner Company, 852 Blackhawk Street, Chicago, Illinois; Brillion Furnace Company, Brillion, Wisconsin; Densmore & Quinlan, Kenosha, Wisconsin; The Kent Company, Inc., 102 Canal Street, Rome, New York; National Super Service Company, 1944 North 13th Street, Toledo, Ohio; B. F. Sturtevant Company, Hyde Park, Boston, Massachusetts.

Brine Resisting Paint

From Klenzter & Klenzter, Fowler, Indiana.

Where can we buy paint that strong salt brine has no effect on?

Ans.—The Ruberoid Company, 5333 South Western Avenue; The Tropical Paint & Oil Company, 1949 Leland Avenue; both of Chicago.

Auxiliary Heater

From Lennox Furnace Company, Syracuse, New York.

Who manufactures an auxiliary heater for heating water for domestic use in the summer time?

Ans.—James B. Clow & Sons, 201 North Talman Avenue, Chicago.

Crude Oil Burners

From J. A. Fisher, Lodi, Ohio.

Who manufactures crude oil burners for warm air furnaces?

Ans.—Automatic Burner Company, 1823 Carroll Avenue, Chicago, Illinois; Silent Glow Heater Corporation, 1000 Park Street, Hartford, Connecticut.

Acid Swabs

From American Heating & Supply Company, Rockford, Illinois.

Who manufactures Acid Swabs?

Ans.—Cleveland Acid Swab Company, 2003 Marlowe Avenue, Cleveland, Ohio; Potomac Manufacturing Company, 316 South Tenth Street, Philadelphia, Pennsylvania.

"Lead Clad" Products

From C. Ed. Smith Furnace Company, New Castle, Pennsylvania.

Who makes "lead clad" spouting, and products of that nature?

Ans.—Wheeling Metal & Manufacturing Company, Wheeling, West Virginia.

"Mailo" Metal Mail Boxes

From Wendel Furnace & Sheet Metal Works, Hinsdale, Illinois.

Where can we buy "Mailo" Metal Mail Boxes?

Ans.—Penn-Greg Manufacturing Company, 809 University Avenue, St. Paul, Minnesota.

Forms for Concrete Vases

From C. G. Stiglitz & Sons, Louisville, Kentucky.

Where can we get forms for making concrete vases and porch boxes?

Ans.—Artisan Cement Mold Works, 531 James Street, Elkhart, Indiana; Concrete Equipment Company, 535 Ottawa Avenue, Holland, Michigan; Consolidated Concrete Machinery Corporation, Adrian, Michigan; Ornamental Mold Company, 3156 23rd Avenue, Minneapolis, Minnesota.

"Never Break" Cylinder Rings

From Ralph W. Poe, Canton, Illinois.

Who manufactures "Never Break" cylinder rings?

Ans.—The Forest City Foundries Company, 2500 West 27th Street,

Gas Burning Logs

From Brandes Heating Company, Madison, Wisconsin.

Who manufactures gas burning logs for fireplaces?

Ans.—The Colonial Fireplace Company, 4611 West Roosevelt Road; Wm. H. Jackson Company, 318 North Michigan Avenue; both of Chicago.

ASSOCIATION ACTIVITIES



Louisville Sheet Metal and Roofing Contractors Elect Officers

On May 7, the Sheet Metal and Roofing Contractors Association of Louisville, Kentucky, elected new officers.

The new president is Mace Holstner, who has been active in the local, state and national associations. Albert Fink was elected Vice-President. John J. Hession is the new Corresponding Secretary. His address is Hession Roofing Company, 1221 West Market Street. Lee Harpring is the new Financial Secretary. Ed. Merrick, who was President of the National Association of Sheet Metal Contractors in 1929, has been the Louisville Treasurer for several years and was re-elected. Jake Bailen is the new Sergeant-at-Arms.

A. S. H. V. E. Summer Meeting at Swampscott

Members of the American Society of Heating and Ventilating Engineers who gather for the Semi-Annual Meeting, 1931, at Swampscott, Mass., June 22 to 25, will find a wonderful program of technical subjects provided for discussion and a sports and recreation program which will keep every minute occupied.

New Ocean House, one of the show places at the North Shore, is the meeting headquarters.

Registration will begin on Monday, June 22, in the south lobby of the New Ocean House and the remainder of the day will be devoted to various committee meetings.

At noon a luncheon for the officers and authors of papers will be held and during the afternoon the council and various committees will meet. All events will be held on daylight saving time.

Three technical sessions are to be held from 9:30 a. m. until 12:30 p. m. with the remainder of each day, Tuesday, Wednesday and Thursday available for sports, inspection trips or sightseeing.

Among the papers on the technical program are:

"Using Gas Vapor Mixtures for Heating Purposes," by C. A. Dunham.

Report of Committee on Testing and Rating Unit Ventilators, John Howatt, Chairman.

"Essential Elements for Determining Heating Plant Requirements," by F. B. Rowley.

"Study of Performance Characteristics of Oil Burners and Low Pressure Heating Boilers," by L. E. Seeley and E. J. Tavanlar.

Report of Committee on Ventilation Standards, by W. H. Driscoll, Chairman.

"Infiltration Through Double Hung Wood Windows," by G. L. Larson, D. W. Nelson and R. W. Kubasta.

"The Measurement of the Flow of Air Through Registers and Grilles," by L. E. Davies.

Committee of Ten Studies Stokers

An analysis of sales of stokers and various types of solid fuel burning equipment and a study of smoke abatement and of the possibilities of increasing the use of solid fuels in the domestic heating field are to be undertaken by the Committee of Ten. Coal & Heating Industries as a result of the April meeting of the committee held at Columbus, Ohio, in conjunction with the annual convention of the National Warm Air Heating Association.

An interesting report was presented by Chairman H. A. Glover, of the Committee of Ten, covering the stoker tests recently conducted at Purdue University through the co-operation of the university and the Indiana Coal Operators Association. It was announced that complete data on the tests would be available to the public probably before the end of May. Tentative arrangements, the report indicated, had been made with the university authorities for further tests intended to reveal comparative efficiencies and costs of stoker-fired coal with competitive fuels.

Chairman Glover suggested, and the suggestion was approved by the committee, that recommendation be made to the Illinois Coal Bureau and the National Warm Air Heating Association for a co-operative arrangement for stoker fired Illinois coal and competitive fuels tests at the University of Illinois, using the existing facilities of the National Warm Air Heating Association at Urbana.

Appointment of the following standing committees was announced by Chairman Glover, the first named in each instance to serve as chairman of the committee:

Ways and Means—George Harms, H. A. Glover, E. B. Langenberg.

Local Meetings—E. B. Langenberg, Lorin W. Smith, Jr., R. A. Miller.

Joint Service—H. M. Hart, Carlyle M. Terry, Homer R. Linn.

Manuals—Homer R. Linn, Carlyle M. Terry, R. A. Miller.

Publicity and Speakers—Lorin W. Smith, Jr., Harry Kurtz, C. M. Terry.

Standards of Products and Practices—Coal—Carlyle M. Terry, R. A. Miller, L. H. Dayhoff.

Heating—Homer R. Linn, George Harms, E. B. Langenberg.

Stokers and Accessories—Harry Kurtz, Ben L. Boalt, T. A. Marsh.

Special guests of the committee at the meeting were the new president of the National Warm Air Heating Association, I. L. Jones of Utica, N. Y.; re-elected Managing Director Allen W. Williams of Columbus, Ohio, and members of the board of directors of the National Warm Air Association.

Allied Construction Industries of Michigan Organized

Following several Committee meetings, attended by representatives from the five established units of the Allied Construction Industries, namely Detroit, Flint, Saginaw, Grand Rapids and Muskegon, a State Association has been organized and is now in the process of incorporation. This will be known as the Allied Construction Industries of Michigan.

At a meeting held in Lansing on March 31st the following were elected officers of the organization: President, Mr. Wm. W. Busch, Detroit; Vice-President, Mr. Walter Gross, Flint; Secretary, Mr. F. E. Ederle, Grand Rapids; Treasurer, Mr. Jule Westra, Grand Rapids.

This organization has for a purpose many very commendable objectives a few of which are herewith outlined: 1. To promote to the extent of their ability the welfare of the citizens of this State and to protect them as far as they are able from exploitation by unscrupulous operators in the industry. 2. To promote the welfare of the construction industry. 3. To conserve and protect invested capital of the construction industry. 4. To relieve any one branch of the industry of the burden of financing any other branch.

NEW ITEMS and NEWS ITEMS

From and about the Manufacturers and Jobbers

L. J. Mueller, Jr., President L. J. Mueller Furnace Co., Dies

L. J. Mueller, Jr., President and General Manager of the L. J. Mueller Furnace Co. of Milwaukee, died on Monday, May 4, 1931, at the age of 64. Although in failing health for the past two years, Mr. Mueller had been at his desk until a week before his death.

The business of which he was the head was founded as a tin shop and retail hardware store by Mr. Mueller's father, L. J. Mueller, Sr., in the year 1857. Starting work as a young man in his father's furnace shop, Mr. Mueller lived to see products of his manufacture in the heating and ventilating line installed throughout the country.

In 1890, Mr. Mueller assumed active management of the business, and in 1900,



L. J. Mueller, Jr.

when the company was incorporated, he was elected Secretary. Upon the death of his father in 1919, Mr. Mueller became President, in which capacity he continued until his death.

During the many years in which Mr. Mueller guided the destinies of the company he has witnessed its steady, conservative growth from a purely local business to its present position as one of the leading enterprises in the heating industry, with branches in Chicago, St. Louis, Detroit, Minneapolis, Seattle, Baltimore, Salt Lake City, Memphis and Los Angeles, and dealers and distributors in all sections of the country.

Because of the frankness and honesty which characterized all of his dealings

with associates and competitors alike, Mr. Mueller enjoyed the respect and esteem of everyone with whom he came in contact. As an active member of various associations in both the furnace and boiler industry, his opinions were solicited and welcomed, and his judgment respected, for the betterment of the industry.

While it is true that in his death the industry has suffered a distinct loss, it is a consolation to know that the principles and high ideals for which he stood so steadfastly are deeply inculcated in the business of which he was the head, and will continue to serve as a tribute and monument to his memory through the years to come.

Francis C. Moran Joins Detroit-Michigan Stove Co.

Francis C. Moran, who for several years has been sales manager with the Peninsular Stove Company, has left that company to take charge of the furnace department of the Laurel, Jewel and Garland divisions of the Detroit-Michigan Stove Company, Detroit.

Hoersting & Holtmann Co., Dayton, Ohio, Introduce Air Conditioner

The Hoersting and Holtmann Company, warm air heating contractors of many years standing in Dayton, Ohio, are now manufacturing a new air conditioning unit consisting of a washer with the necessary controls and sprays all housed in a rectangular sheet metal housing.

The new unit comes equipped with pressure gauge, shut off valves, spray nozzles, solenoid valve controlled by a thermostat.

The unit will be manufactured in six sizes rated from 50 to 325,000 B.t.u.

Literature describing and pricing the units is ready and will be mailed to persons interested. Write the company at Dayton, Ohio.

Associated Machine Tool Dealers' Convention

The Associated Machine Tool Dealers will hold its semi-annual convention at Granville Inn, Granville, Ohio, June 4 and 5.

Columbus Humidifier Co. New Humidifying Unit

The Columbus Humidifier Company, Columbus, Ohio, is now mailing to prospective customers a broadside describing a new humidifying unit which the company claims has several important improvements.

The manufacturers say the humidifier can be quickly and easily installed on any type of furnace in 45 minutes to an hour by any one workman.

In addition, the humidifier can be as easily removed and installed on a new furnace when the old one is discarded.

Tests show as much as twelve gallons of water are evaporated in 24 hours in the coldest weather. Under ordinary firing conditions the unit will evaporate one gallon of water per room per day.

The entire action is automatic and the amount of water evaporated is in correct proportion to the heat of the furnace. The water level is maintained by an external, fin-cooled valve which is simplicity itself. This cold water valve cannot become limy or dirty. It has a tapered, non-absorptive composition valve gasket and seats against a bronze seat of the same taper, giving it a wiping action each time the valve opens or closes.

Milcor Introduces "Titelock" Hangers

The "Titelock" Single Bead Eaves Trough Hanger, of unusual design, has been placed on the market recently by the Milcor Steel Company, Milwaukee, Wisconsin.

"Titelock" Hangers are made entirely of galvanized steel and will fit any make of eaves trough. They have many advantageous features.

The "Titelock" Hanger is easily and speedily applied. The strap is bent around the trough, inserted through the slot and tightened into position. Only a pair of pliers is necessary to adjust the "Titelock" Hangers. The stem can be bent to fit the angle of the roof.

"Titelock" Hangers are strong, yet simple in construction and make a neat, good-looking installation. For durability, compactness, ease of handling, true fitting qualities and low cost, no more satisfactory hanger can be purchased.

Samples furnished upon request.

The SHOW-ME ATTITUDE

Has Been Adopted by Your Customers

Can you prove to them that the furnace you are selling will give them full value for their money?

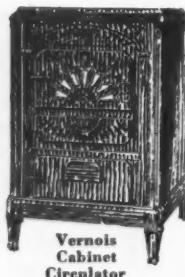
No Frills—But the Ultimate in Furnace Value and Construction has always been the aim of the

Vernois

NOW—More than ever this policy is proving itself the best. Vernois dealers have made a very satisfactory showing so far in 1931.



Compare the Vernois point by point with any other furnace. Then write for particulars on our unequalled dealer proposition.



Complete line of enameled circulating heaters, for gas, coal, or wood. Enameled Gas Ranges in new Console and table top models.



Mt. Vernon Furnace & Mfg. Co.
Mt. Vernon, Illinois

MARSHALLTOWN



SHEARS

HERE ARE 3 TYPES of MARSHALLTOWN THROATLESS SHEARS

"YOU NEED ONE OF THEM"

No. 18H

Here's a hand powered throatless shear which will cut up to 18 gauge metal. Straight cutting or curves in any or all directions on sheets of any width, made of the finest grade materials. Price within the reach of the very smallest operator.

SPECIFICATIONS: Capacity—18 gauge and lighter— $1\frac{3}{4}$ " radius. Cutters— $2\frac{1}{2}$ " x $1\frac{1}{2}$ "—high grade tool steel—slightly knurled to feed material. Adjustment—one bolt—instructions furnished. Size and Material—height $19\frac{1}{2}$ "—head cast iron—base cast iron—gears steel and cast iron—shipping weight 45 lbs.



No. 114

A sturdy, substantial, simply designed, easy to operate machine. Cuts in any direction—curves, straight and unusual designs. Handles material up to $\frac{3}{4}$ ". Simplicity of construction makes it impossible for any moving part to get out of order. Can be equipped with motor power if desired. 1 H. P. 1750 R. P. M. motor required.



SPECIFICATIONS: Capacity $\frac{3}{4}$ "—maximum cutting radius $5\frac{1}{2}$ ". Cutters $5\frac{1}{2}$ " x $1\frac{1}{2}$ "—one cutter knurled to feed material. Adjustment made easily. Full instructions furnished. Speed 315 R. P. M. Cuts 6" per minute. Material—head steel casting—base grey iron casting—gears steel and cast iron. Style No. 114-P Belt power—No. 114M motor power. Floor Space—26" x 26". From Floor to Cutters—41".



No. 18M

This is No. 18 motor driven—same specifications as No. 18H but equipped for faster cutting. Requires $\frac{3}{4}$ H. P. motor and is equipped with friction clutch so operator can stop machine without stopping motor.

Net weight 110 lbs. Shipping weight 135 lbs.

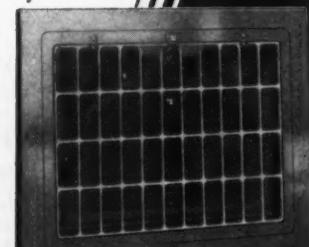
**LET THE CATALOG TELL
THE STORY. WRITE
FOR IT NOW!**

MARSHALLTOWN MFG. CO.

MARSHALLTOWN
IOWA

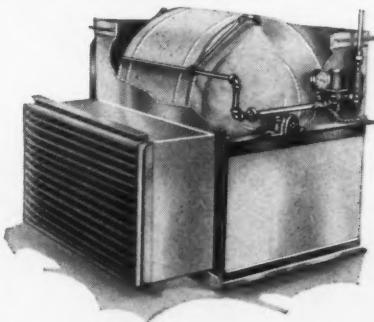
Here's A Thought Worth A Lot of Consideration

BEYOND a doubt in many cases your customers leave the matter of register selection entirely to you—relying on you to supply the best available. Sooner or later, however, they are bound to compare their registers with those they see in other homes. Which is just another reason for standardizing on H & C registers. When that comparison is made, if you have provided H & C registers the reaction is certain to be all in your favor; for H & C registers are both beautifully designed and surpassingly well built in every detail. Good-will is immediately increased, and after all, that is the most valuable asset in business. H & C registers cost no more than others. There's a type and style best suited to every purpose. Decide now to standardize on them. Leading jobbers carry complete stocks.



No. 150 Series, two-piece register. Also made in one-piece type, No. 160.

Now! A One Unit Blower and Air Conditioner



---for Homes

A REVOLUTIONARY improvement for home heating jobs, offering big advantages to the dealer who is first to handle it in his community.

This new Am-Pe-Co Air Washer-Blower combines BOTH forced-air and air-conditioner in one unit. A radical saving in cost and floor space over the double installation formerly required. A larger profit to the dealer. And a more satisfactory job for the home owner.

Provides clean, washed air at minimum cost; humidifies air scientifically, guarantees uniform circulation for any type installation. Compact and simple in operation. Functions as a blower, an air washer, a summer cooling system, or all in one, as desired. Write for illustrated circular and prices today.

*Ask also about the Am-Pe-Co Blower
for forced air systems only*

Hart & Cooley Mfg. Co.

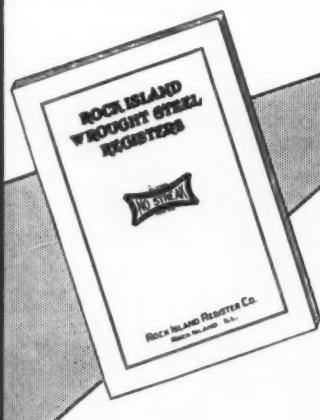
CHICAGO, 61 W. Kinzie St. NEW YORK, 101 Park Ave.
PHILADELPHIA, 1600 Arch St. BOSTON, 75 Portland St.
NEW BRITAIN, CONN. — NASHUA, N. H.

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ISLAND
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REGISTER LINE**

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WALL STEEL FLOOR
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Register satisfaction is assured
with Rock Island. But let the
catalog tell you all about the
Rock Island Line!

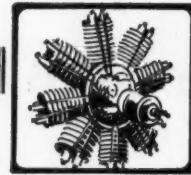
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ROCK ISLAND REGISTER COMPANY
Rock Island, Illinois

Send me your catalog No. 10 just off the press.

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**Why an air-cooled
motor in a furnace ad?
Because:**

It illustrates why fins are used on a furnace. Simply to throw off or radiate **more heat**. That explains the reason for the Patented Hall-Neal Victor Fins. Only Hall-Neal dealers can sell "finned heat satisfaction."

**HALL-NEAL
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*"The Furnace with FINS. 20% Increase
Heat Radiation"*

Let us tell you about the Hall-Neal "FINNED
HEAT" Victor Furnace and the unusual
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HALL-NEAL FURNACE COMPANY
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HEAT RADIATING FINS

THE
"BIG THREE"
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AIR CONDITIONING

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DISTRIBUTORS IN ALL PRINCIPAL CITIES

Say you saw it in AMERICAN ARTISAN—Thank you!

Those at the Convention Were Convinced

that America is still America—and that Americans are going to continue to live in well-built and well-heated homes.

that there IS, and will always be, profitable business for those who make the necessary effort to get and handle it.

that, like good Plymouth Rock hens, we'll simply have to keep on scratching—and that energetic scratching will produce results.



You'll find that **HANDY PIPE** will be "with you to the last scratch," and that, as always, "The Handy Pipe People Are a Mighty Good Bunch to Tie To."

F. Meyer & Bro. Co.
PEORIA ILLINOIS

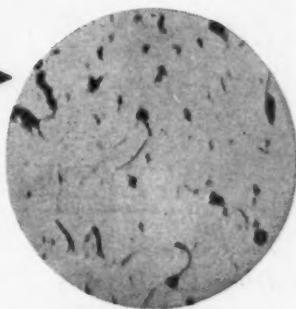
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Put the Furnace You Sell Under a Powerful Magnifying Glass If It's a **BRILLION FURNACE**

IT WILL LOOK
LIKE THIS →

The photomicrograph at the right shows 'Lectromelt Iron magnified over 200 times. Very little free carbon is apparent. Note the density. Even strength throughout. Superior castings are always assured by the 'Lectromelt process.



'LECTROMELT
Processed Iron
Magnified 200 Times

But If It's an Ordinary Cast Furnace—It Will

LOOK LIKE
THIS →

The photomicrograph at the right shows Cupola Iron magnified 150 times, illustrating conclusively why this type of metal has weak spots. Note the black spots. That is the free carbon present. Remember no metal is stronger than its weakest spot.

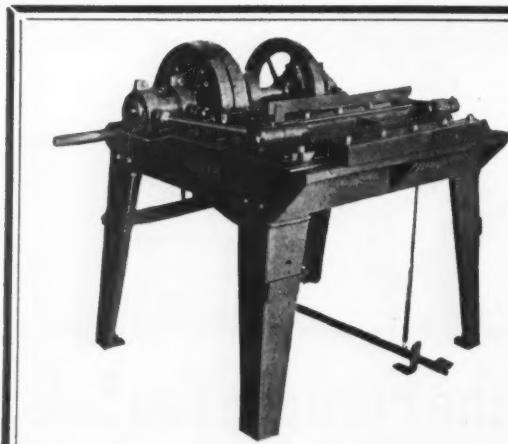


ORDINARY
Cupola Iron
Magnified 150 Times

Only **BRILLION FURNACES** Are 'LECTROMELT "Processed"

Let us tell you
all about the
Brillion Line.

BRILLION FURNACE COMPANY
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Yoder L-300 Stove Pipe Seaming Machine

THIS machine is built with a combination set of 3 pairs of dies, and completely forms the edges of Stove Pipe Sheets, ready for seaming. The bed is of ample proportions, cast in one piece, including all bearings. The shafts are large and all parts sufficiently heavy to permit of rapid operation and produce accurate work. The dies are accessible, permitting of quick and easy adjustment and are of sufficient length to seam 31" sheets, of No. 22 gauge or lighter. Curling rolls can be attached to frame of the machine, permitting seaming and curling pipe with one handling. Net weight—2700 pounds.

Harry G. Masten Company, 4119 N. Lawler Ave., Chicago Sales Representative

THE YODER COMPANY
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PLATE AND SHEET METAL MACHINERY SPECIALISTS

WHICH:-- IS THE STRONGER? RIVETED OR WELDED JOINTS

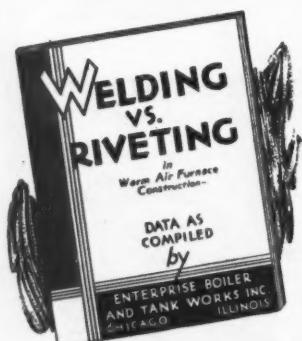
The American Society of Mechanical Engineers Say:

WELDED JOINTS

Their Report Reads:

RIVETED JOINTS	47.7
WELDED JOINTS	90.0

(Inside and Out)



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BOOKLET TELL
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LEARN WHY
Double Welded
PURE AIR
HEATERS ARE
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ON Cash In Public Demand "HOME COOLING" During the Summer Months

KORECTAIRE The CORRECT AIR MACHINE

Dealers everywhere are making Big money selling blower and fan equipment for home cooling during the summer as well as for forced heat in winter. The "Korectaire" meets these requirements and each installation is your best advertisement.



The "Korectaire" is a positive pressure blower. It humidifies and cleans the air. It is quiet, easy to install, and lends itself readily to any number of air returns. Let us send you illustrated literature and prices.

Write for Full Details Today

WATT MFG. COMPANY STERLING
ILLINOIS

"D-Q" The MOST POWERFUL Suction Cleaner Made

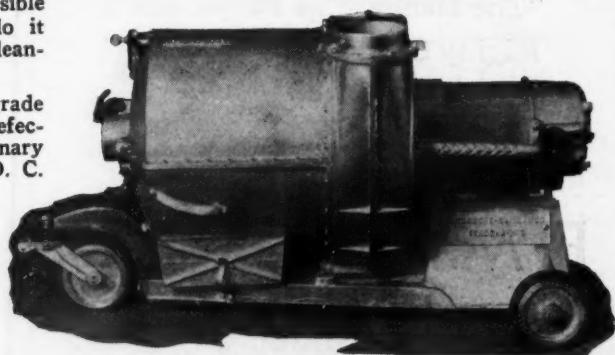
THE extra power of the "D-Q" Cleaner makes it possible for you to do a REAL CLEANING job and to do it QUICKER. With the "D-Q" you can actually make the cleaning job itself pay you a profit.

It's *light weight*—made of highest grade cast aluminum—guaranteed against defective parts and it operates in *any* ordinary house lighting socket either A. C. or D. C. current from 110 to 125 volts.

Write today for our *NEW* four page folder which illustrates and describes the "D-Q" Super Suction Cleaner in detail.



DENSMORE-QUINLAN CO.
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The perfected result of over 30 years experience in the manufacture of sheet metal bending machines. Over 25,000 machines in use.



POWER BRAKE

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FORMING PRESS

The most complete and up-to-date line of sheet and plate bending and forming machines in the world. Lengths, 3 to 16 feet, with capacity to bend from the lightest metals up to $\frac{1}{4}$ in. plate, cold.

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—PUNCHES—



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for
This Catalog
Immediately



W. A. WHITNEY MFG. CO.
636 RACE STREET
Rockford
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*The Choice of
OVER
5000
Satisfied Users*

Distributors Wanted In Open Territory

*For Continuous Graduated Flame
Oil Burner*

the only burner of its kind with 7 years of successful operation in all types of heating systems.

No gas pilot—no electric ignition—fully automatic and positive oil and air control—delivers *Balanced Heat, the Ideal Method of Home Heating*. Absolutely without competition—highest quality workmanship and materials—efficient and thoroughly dependable—guaranteed for five years. Installed prices \$345 to \$520. Tanks extra. Approved by Underwriters.

Complete Dealer's Sales and Finance Plan



Write for This FREE BOOK

which explains the McIlvaine method of Balanced Heat—the McIlvaine 1931 Sales Plan and special proposition to dealers in territory where we are not represented.

McILVAINE BURNER CORP.
747 Custer Avenue Dept. A. Evanston, Ill.
Member of American Oil Burner Association and
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WHAT DO YOU EXPECT OF THE FURNACE CEMENT YOU USE?

WORKABILITY?

If the furnace cement you use must be easy to work, easy to use, easy to pack, this is the one important reason you purchase a certain brand,

Then Use LASTIK—

ECONOMY?

If the furnace cement you use must go further, must pound for pound do more work and must be high in quality yet economical,

Then Use LASTIK—

PERMANENCY?

If the furnace cement you use must last, and when hard become a part of the furnace; if it should not crack, shrink, or crumble,

Then Use LASTIK—

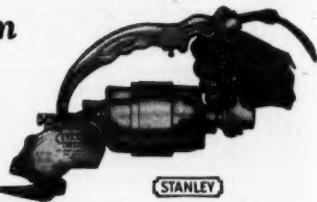
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FURNACE CEMENT
LOOK FOR THIS LABEL



Lastik Products Company, Inc.
Oliver Building
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Stanley-Unishear "Mighty Midget"

"The motor driven hand shear"



For inside and outside cutting of sheet materials of every description.

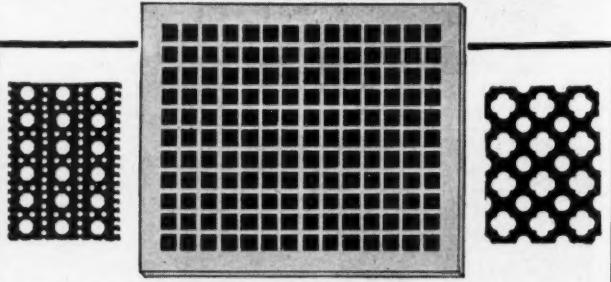
With a cutting speed of 15 feet per minute this tool increases the earning power and saves the energy of the men who use it.

It has a capacity of No. 18 U. S. Gauge (.050") hot rolled steel or galvanized iron.

THE STANLEY ELECTRIC TOOL CO.
New Britain, Conn.

Absolutely safe to work with.
Send for complete description to-
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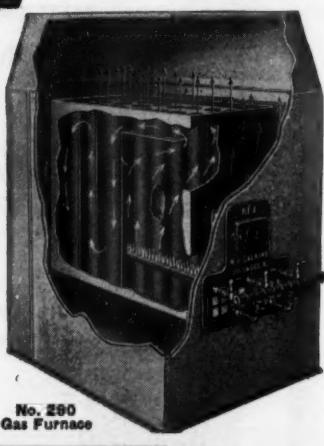
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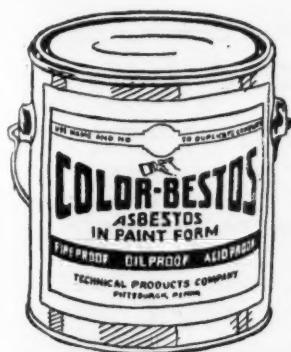


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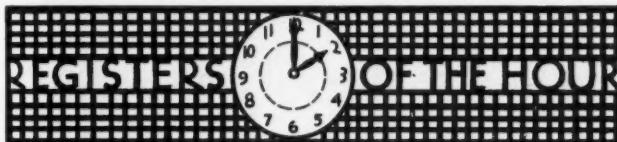
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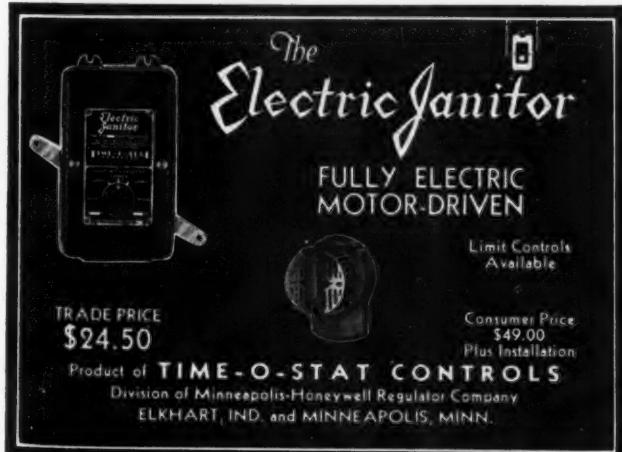
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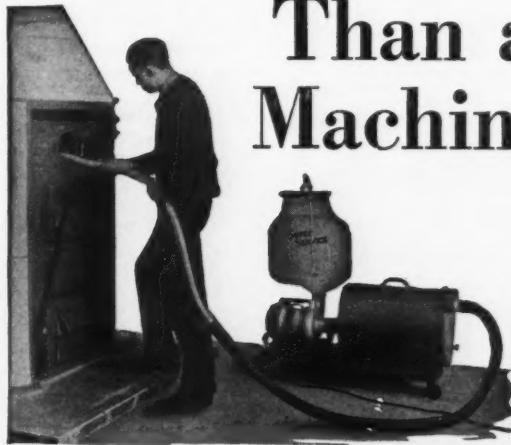


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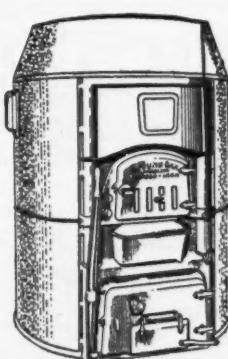
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(Continued from page 68)

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St. Louis Technical Institute, St. Louis, Mo.

Schools—Warm Air Heating

St. Louis Technical Institute, St. Louis, Mo.

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Kester Solder Co., Chicago, Ill.

Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.

Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.

Solder—Acid Core

Kester Solder Co., Chicago, Ill.

Ryerson & Son, Inc., Jas. T., Chgo., N. Y., St. L., Det., Cleve.

Solder—Rosin Core

Kester Solder Co., Chicago, Ill.

Solder—Self-Fluxing

Kester Solder Co., Chicago, Ill.

Ryerson & Son, Inc., Jas. T., Chgo., N. Y., St. L., Det., Cleve.

Soldering Furnaces

Diener Mfg. Co., G. W., Chicago, Ill.

Ryerson & Son, Inc., Jas. T., Chgo., N. Y., St. L., Det., Cleve.

Specialties—Hardware

Diener Mfg. Co., G. W., Chicago, Ill.

Stars—Hard Iron Cleaning

Fanner Mfg. Co., Cleveland, Ohio

Stove Pipe and Fittings

Meyer & Bro. Co., F., Peoria, Ill.

Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.

Stove and Furnace Trimmings

Fanner Mfg. Co., Cleveland, Ohio

Strainers—Roof

David Levow, New York, N. Y.

Rival Strap Corp., New York, N. Y.

Timplate

Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.

Osborn Co., The J. M. & L. A., Cleveland, Ohio

Tools—Tinsmith's

Bertach & Co., Cambridge City, Ind.

Dreis & Krump Mfg. Co., Chicago, Ill.

Hyro Mfg. Co., New York, N. Y.

Interstate Machinery Co., Chicago, Ill.

Marshalltown Mfg. Co., Marshalltown, Iowa

Osborn Co., The J. M. & L. A., Cleveland, Ohio

Peck, Stow & Wilcox Co., Southington, Conn.

Rockford Sheet Steel Co., Rockford, Ill.

Torches

Diener Mfg. Co., G. W., Chicago, Ill.

Osborn Co., The J. M. & L. A., Cleveland, Ohio

Ryerson & Son, Inc., Jas. T., Chgo., N. Y., St. L., Det., Cleve.

Vacuum Cleaners—Furnace

Breuer Electric Mfg. Co., Chicago, Ill.

Brillion Furnace Co., Brillion, Wis.

Dennison & Quinlan Co., Kenosha, Wis.

National Super Service Co., Toledo, Ohio

J. M. & L. A. Osborn Co., Cleveland, Ohio

B. F. Sturtevant Co., Boston, Mass.

Ventilators—Ceiling

Hart & Cooley Co., New Britain, Conn.

Henry Furnace & Fdy. Co., Cleveland, Ohio

Independent Reg. & Mfg. Co., Cleveland, Ohio

Ventilators—Floor

Aeolus Dickinson, Chicago, Ill.

Ventilators—Root

Aeolus Dickinson, Chicago, Ill.

Paul R. Jordan & Co., Indianapolis, Ind.

Milcor Steel Co., Mill, Canton, Chgo., La Crosse, K. C.

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American Wood Register Co., Plymouth

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WITH THESE PRODUCTS**



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CORRUGATED**



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PAPER**

Corrugated Asbestos Board

Asbestos Paper
8-10-12-14-16-32
lbs. per 100 square
feet.
18" and 36" wide—
50 or 100 lb. Rolls

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Corrugated Asbestos Board
A flexible insulation
 $\frac{1}{4}$, $\frac{1}{6}$ or $\frac{1}{8}$ inch
thick. Especially
adapted for wrapping
furnace pipes.

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Made in our own plant from
16 Ga. Galvanized Steel or
Ingot Iron—Also Copper and
Brass—are practical—eco-
nomical—and easy to install!

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THE J. M. & L. A.
MANUFACTURING COMPANY
DETROIT-CLEVELAND-BUFFALO
"Everything Used in Sheet Metal Work"

WATERBURY SEAMLESS FURNACE PIPE OR PIPELESS

**Permanently
Gas-Tight**

**One-Piece Steel
Construction—
Durable and
Economical**

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Minnesota



GEO. W. DIENER MFG. CO.
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The "Torrid" Furnace
is designed to give a
tremendous amount of
heat, much more than
that furnished by the
ordinary tinner's fur-
nace.

A fuel saver and gen-
erating machine of the
finest quality made at
the price.

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*Thermodynamically
Controlled*
**Automatic
HEAT BOOSTER**

**THE
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TO SELL**

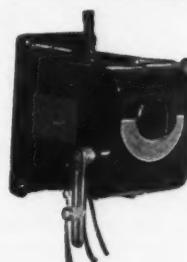
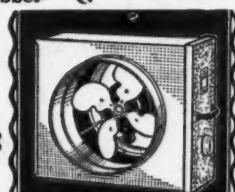
Sell an A-C as
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make a good profit
for you and make a
booster of the customer.

A-C Manufacturing Co.
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**MAKES EVERY
INSTALLATION
BETTER**

Builds customer
satisfaction and
boosts the effi-
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installation.

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Sell... The SENTINEL REGULATOR

It's the best money can
buy. All Electric—No
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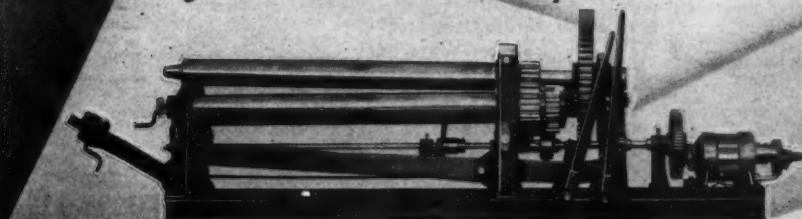
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Manufacturers of Modern and Sentinel
Regulators
CLEVELAND OHIO

Our Line

Light and heavy
machinery for all
classes of sheet
metal, plate and
structural
work

PLATE BENDING ROLLS

Capacities—Lightest sheet to heaviest plate



BERTSCH & COMPANY
Cambridge City

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Classified Advertising

BUSINESS CHANCES

Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. L. K. Diddie Company, Marshfield, Wis.

For Sale—Sheet metal shop equipped fully to work all metals including 14 gauge steel in busy section of Chicago, close to several live suburbs. Reasonable rent—also priced reasonable. Address R-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

A modern sheet metal manufacturing shop, with up-to-date facilities desires connection with any person having a sheet metal article of merit to manufacture, patented preferred, adapted for western states, Oriental, or South American trade, we are located in a leading Pacific Coast city. Address O-537, American Artisan, 139 N. Clark Street, Chicago, Ill.

For Sale—Plumbing, heating and tin shop in one of the best towns in north east Nebraska and in the best farming community in the state. Will sell at a bargain if taken at once. Must sell on account of failing eyesight. Stock and tools about \$4500. \$1500 will handle it by the right party. Have done \$30,000 business in a year. This is a snap for a good mechanic. Address D-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

For Sale—A complete Hardware and Tin Shop in town of 3000 in best farming community in Ohio. Shop tools consist of 8 foot brake, 30 inch shear, and all other tools necessary. Will sell tools and store fixtures separate or all together. Stock reduced to around \$7,500. Address W-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

HELP WANTED

Harry T. Klugel, North Emporia, Virginia, would be glad to hear promptly from Jack W. Davis, sheet metal worker, formerly of Richmond, Virginia. Anyone knowing of his whereabouts please advise. S-536

High grade furnace salesmen calling upon jobbing, sheet metal and furnace trade to handle a national line of Blowers and Air Conditioning equipment, as a full or part time occupation, on a commission basis. Address L-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Wanted—Furnace salesman who has had experience selling to furnace dealers. Territory, Ohio, West Virginia, and Pennsylvania. In replying write to E-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois, stating experience, name of firms, term of employment, and also initial salary expected.

Wanted—Salesmen on straight commission basis for the following territories—Ohio, Indiana, Illinois, Iowa and Minnesota. Address Schwab Furnace & Manufacturing Company, Cedar Grove, Wisconsin. B-537

SITUATION WANTED

Situation Wanted—By an all round tinner, good furnace and gutter man. Steady, reliable, active, married, no children. Reasonable wages. Address P-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

SITUATION WANTED

Situation Wanted—By first class steam fitter, sheet metal worker, and furnace man. Can make estimates and layouts on steam, forced air, or gravity jobs. Have had twenty years experience in selling and installation. Married. Strictly sober. Address D-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By a tinner. City and country experience. Address J. H. Dennick, Juda, Wisconsin. A-537

Situation Wanted—By first class tinner and furnace man. One that can do plumbing or clerk in hardware store. Would go anywhere, but would prefer middle west. Fully capable of taking full charge of a general shop. Large and small town experience. Would consider a shop on percentage, if it has a good volume of furnace business. Address W-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By heating, ventilating and sheet metal man with twenty years experience. Capable of handling the large and difficult jobs as well as small ones. Experienced in fans, air washers, indirect steam, layout and pattern drafting. Have had gas furnace and gas appliance experience, selling and estimating. Have handled such jobs as high schools, theaters, government post offices, etc. Can take full charge. Prefer extreme southwest states but will go anywhere. Age 41. Good health and habits. References. Address H-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By all around tinner, furnace and hardware man. Competent and experienced. References. Address J-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—Have been Superintendent of sheet metal shop for heating and ventilating company for eight years. Can make layouts, square casings, ducts and fittings for any residence forced air job. Address F. B. Howe, 31 West Home Street, Westerville, Ohio. Y-536

Situation Wanted—By general all around sheet metal worker. Prefer a jobbing shop. Thirty-eight years of age and married. Will go anywhere west of Chicago. Address Z-536, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By first class combination man. Middle Aged. Good salesman. Can handle shop if necessary. A-1 references. Can furnish all tools for heating and plumbing. Address K-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By a strictly first class all around sheet metal worker with 25 years' experience. Can lay out patterns, read blueprints and handle any kind of a job that may come to any sheet metal shop. Address Edward H. Collins, 417 Jones Street, Clearwater, Florida. L-537

Situation Wanted—Position as credit and sales manager, or would consider road job. Age 50, 25 years experience in credits and salesmanship. Would like to correspond with legitimate firm needing such help where the future would be open for a small investment. Address R-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By a first class plumber and sheet metal worker. Prefer town or small city in southern New York or northern Pennsylvania. Can do anything under these trades, new or repair work. Can furnish best of references from employer and customers. Address T-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

SITUATION WANTED

Situation Wanted—By experienced sheet metal worker. Can do roofing, furnace work, and general jobbing. Can furnish references on request. Address W. E. Benninger, c/o J. C. Weston, 53 S. Pearl Street, Youngstown, Ohio. X-537

Situation Wanted—By a competent tinner and plumber with 7 years experience. Can furnish best of references. Prefer Minnesota or Iowa. Address Y-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Ill.

Situation Wanted—By experienced hardware clerk. Can also install furnaces, and do all kinds of sheet metal work. Prefer Wisconsin. Address General Sheet Metal Works, 523 Bridge Street, Wausau, Wisconsin.

Situation Wanted—By sheet metal worker with 18 years journeyman experience in all general sheet metal work. Can lay out patterns and handle jobs all the way through. Can estimate, and sell jobs. Would consider a good shop on percentage. Prefer Illinois. Address P-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

TOOLS AND MACHINES

For Sale—Tinners bench machines and tools. Address P. C. Wold, Box 548, Pierre, South Dakota. T-536

Wanted—Furnace suction cleaner. Must be in good condition and reasonable. Address Schwarzkopf Sheet Metal Works, Waupaca, Wisconsin. B-538

MISCELLANEOUS

Wanted—Equipment for manufacturing metal culverts. Must be in good condition and reasonable. Address Sam H. Kerr, Lufkin, Texas. C-537

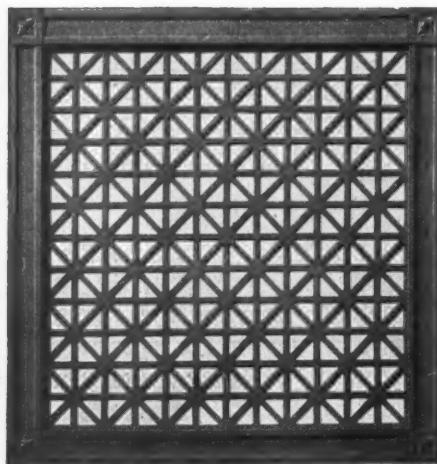
For Sale—2800 pounds Asbestos Paper 10 lb. weight, 36" wide in 100 lb. rolls—4c per pound, any amount. F. O. B. Rockford, Illinois. Address Lee N. Wagener, 1208 North Main Street, Rockford, Illinois. G-537

Wanted—As a large field of natural gas is about to be opened in this vicinity, I should like literature and prices from manufacturers of gas appliances for house heating purposes, Steam, Hot Water, and Warm Air Furnaces, also Gas Built Furnaces and Boilers. Address B. A. Hight, Mount Pleasant, Michigan. S-537

SPECIAL NOTICE

Wanted—High grade salesmen calling on furnace dealers, jobbers or manufacturers, to sell a new, practical, and reasonably priced furnace filter as a full or part time occupation. Commission basis. Address Z-537, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Perforated Metals... for every purpose



No matter what the uses we can perforate metal to meet the purpose. In Public Buildings, Churches, Schools, Factories and homes our grilles are dominant. There are hundreds of designs to select from.

"GRILFRAME"

Enhances the beauty of any grille by the addition of a border frame of steel. You can do it with "Grilframe." Agents everywhere.

The H. & K. Line consists of perforated sheets and a full selection of Guard accessories.

WRITE FOR CATALOG AND QUOTATIONS. Perforated metal for every purpose

- SAFETY GUARDS -

THE HARRINGTON & KING PERFORATING CO.

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New York Office, 114 Liberty Street

Chicago, Ill., U. S. A.

MEMORANDUM

Write

... to ...

The Graff Furnace Co.

Scranton, Penna.

— for —

The Facts About the New "Faultless" Furnaces

SERIES K-C-2000-2000T

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Name.....

Address.....

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THE RIVAL AND FITRITE One-Piece Ornamental Leader Straps



Made in six styles.
Write for folder
showing complete
line and sizes.
STRAPS SOLD
THROUGH
JOBBERS
ONLY

"FITRITE" Bronze
ROOF STRAINERS
3 Types. For Roofs having in-
side cast iron leader. Type "X"
(illustrated) also made in M. I. Iron

"Fitrite" Adjustable
PIPE SNOW GUARDS
Galvanized Iron or Bronze

Type "X"

Made also
for chain
operation

"FITRITE" SKYLIGHT GEARING

Iron or
Bronze
3/8"-5/8" & 1"
Sizes

Made also
for chain
operation

Write Dept. "A" for full details and prices
Telephone: CChelsea 3-2400

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NEW YORK

Mention AMERICAN ARTISAN in your reply—Thank you!

ANNOUNCING

THE ACQUISITION OF
HYRO MANUFACTURING CO., INC.

BY PARKER-KALON CORPORATION

PARKER-KALON PRODUCTS



**Type "A"
Hardened Self-tapping
Sheet Metal Screws**



**Type "Z"
Hardened Self-tapping
Sheet Metal Screws**



Hardened Metallic Drive Screws



Hardened Screws



Hardened Masonry Nails

WE ARE pleased to announce the acquisition of Hyro Manufacturing Co., Inc., whose line of sheet metal workers' tools and specialties are favorably known and widely used.

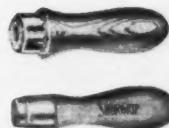
The unified organization will be known as Parker-Kalon Corporation but the products of Hyro Manufacturing Co., Inc., will continue to be made and sold under the Hyro trademark.

This consolidation brings together two concerns that have long been under the same ownership and management, although operated independently. The merger of their interests will result in a larger and more efficient organization with greater resources and every facility for the manufacture, distribution and further exploitation of the products of both concerns.

The progressive merchandising policies of Parker-Kalon Corporation will be continued as heretofore and we shall endeavor to deserve the confidence and good will of an ever growing roster of customers and friends.

PARKER - KALON CORPORATION
190 Varick St. New York, N. Y.

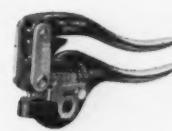
**HYRO
PRODUCTS**



*Shur-Grip Handles
For files and solder
irons*



Unxld Damper Quadrants, Dial Damper Regulators and Accessories



No. OX Metal Punches



No. XX Metal Punches

The Outstanding Advantages of *MILCOR* Rain-Carrying Equipment Mean Greater Profits

*Famous "Crimpedge" Eaves Trough Feature.
Perfectly Formed on Automatic Machines.
Greater Strength and Rigidity.*

THE rain-carrying equipment produced by *Milcor* has many outstanding advantages from the standpoint of thoughtful design . . . Advantages which mean greater profits because of the increased business and the increased satisfaction which they make possible.

The famous "Crimpedge" formed on *Milcor* half round eaves trough is but one illustration. The feature not only adds rigidity and greater strength to the eaves trough, but it also assures a new degree of permanence by preventing hanger slippage . . . It is things like this that make the difference between a good and a mediocre job.

The one-piece mitres produced by *Milcor* are as the name suggests, stamped from a single piece of heavy terne coated material. They are strong and lasting for there is no solder to come loose. Each mitre is doubly protected against rust, by galvanizing after it is formed.

Milcor "Interlock" Conductor pipe is formed in precisely straight, uniform lengths with mechanically tight seams rolled true and strong. So throughout the line, *Milcor* advantages are profitable advantages.

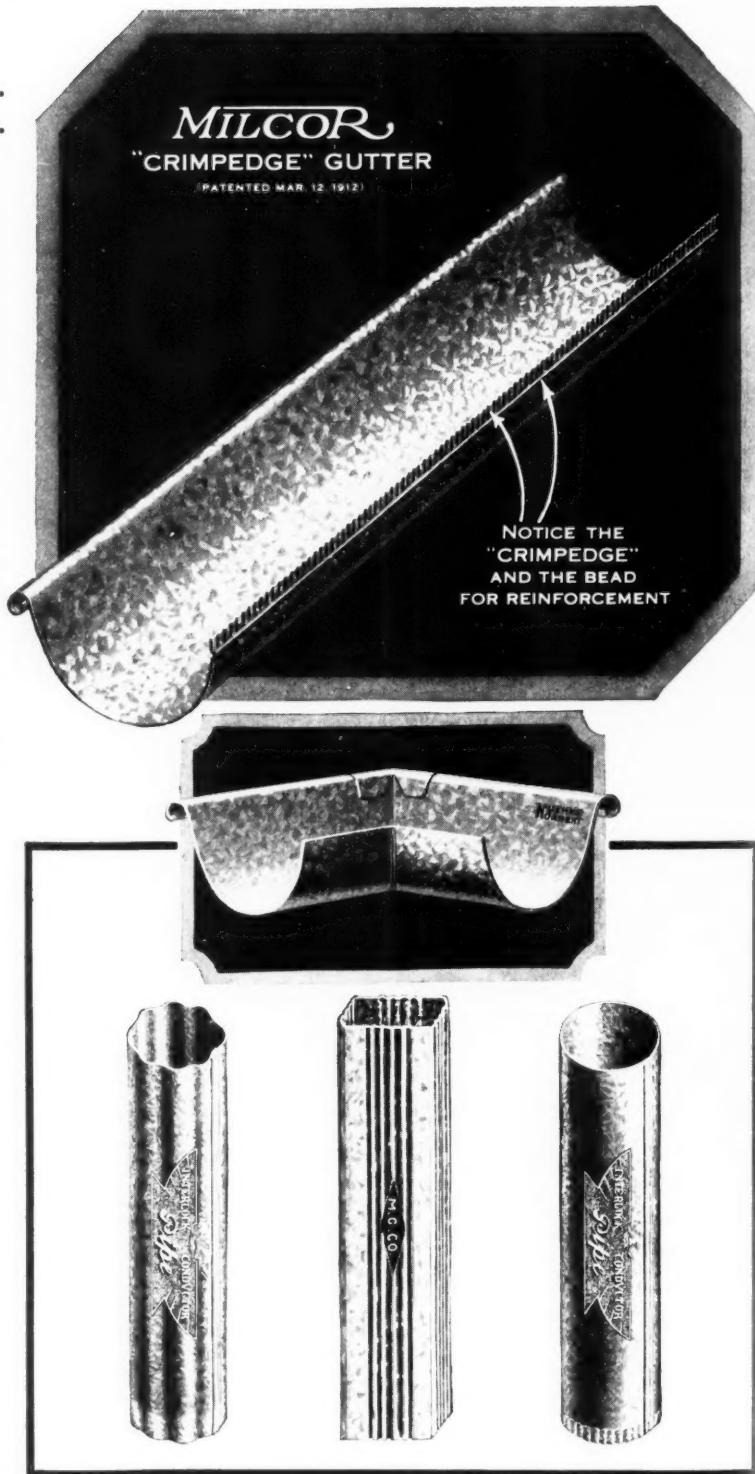
*It is a wise practice, indeed, to standardize on *Milcor* rain-carrying equipment a complete line. If you haven't received the *Milcor* Sheet Metal Hand Book, Catalog No. 28 send for your copy.*

MILCOR STEEL COMPANY

Formerly Milwaukee Corrugating Co., Milwaukee, Wis. and
The Elliot Manufacturing Co., Canton, Ohio.

*Main Offices: 4117 Burnham Street, Milwaukee, Wis.
Plants at Milwaukee, Wis., Canton, Ohio, La Crosse, Wis.,
Chicago, Ill., and Kansas City, Mo.*

*Sales Offices: New York, 418 Pershing Square Building;
Boston, Mass., 726 Little Building; Atlanta, Ga., 207 Bona
Allen Building; Minneapolis, Minn., 642 Builders Exchange
Building; Little Rock, Ark., 194 W. Markham Street*



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Save with Steel